5-4610-205-10

TM 5-4610-205-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

WATER PURIFICATION UNIT: BASE MOUNTED; ELECTRIC DRIVEN, AC, 115, 208 VOLT, SINGLE PHASE AND 3 PHASE, 60 CYCLE; 3000 GALLONS PER HOUR (MET-PRO MODEL 3000-2700A) FSN 4610-857-0330

This reprint includes all changes in effect at the time of publication; changes 1 through 6.

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1963

D 101.11:

READEX FICHE best copy available

SAFETY PRECAUTIONS

Provide adequate drainage so that water will not accumulate around the unit and supporting electrical equipment. Make sure that waste water drains do not flow into the source of raw water supply.

Do not operate the water purification unit without a suitable ground connection. Electrical defects in the unit load lines or equipment can cause death by electrocution when contact is made with an ungrounded system.

Before making any electrical connections, make sure all switches are off and that the power cable is not energized.

Protect the eyes and skin from direct contact with chemicals and solution mix. Be especially careful when opening containers to avoid breathing chemical powder. Never mix the two chemicals, calcium hypochlorite and ferric chloride. These two chemicals, when mixed, give off a greenish yellow gas which is irritating, disagreeable, and has a suffocating odor.

Do not touch metal parts with bare hands during extremely low temperatures.

Do not use gasoline or other such solvents to clean the filter assemblies. Always use filtered water, if available, to prevent contamination of the water being filtered.

Although filtered water is available from the purification unit, tests must be made before initial issue of filtered water and at regular intervals so that chlorine residual can be determined and kept at the desired level.

TM 5-4610-205-10
C 1

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *30 August 1968*

Operator's Manual

WATER PURIFICATION UNIT: BASE MOUNTED; ELECTRIC MOTOR DRIVEN, AC, 115/208V, SINGLE PHASE AND 3 PHASE, 60 CYCLE; 3000 GALLONS PER HOUR (MET-PRO MODEL 3000-2700A) FSN 4610-857-0330

TM 5-4610-205-10, 14 August 1964 is changed as follows:

Cover and page 1. Change "120/208 Volt" to read "115/208 V,".

Page 2. Paragraph 1*d* is superseded as follows:

d. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Page 2. Paragraph 3*c*(2), line 2, page 5 is changed as follows:

Change "(fig 2)" to read "figs 2 and 2.1)".

Page 4. Figure 2.1 is added after figure 2.

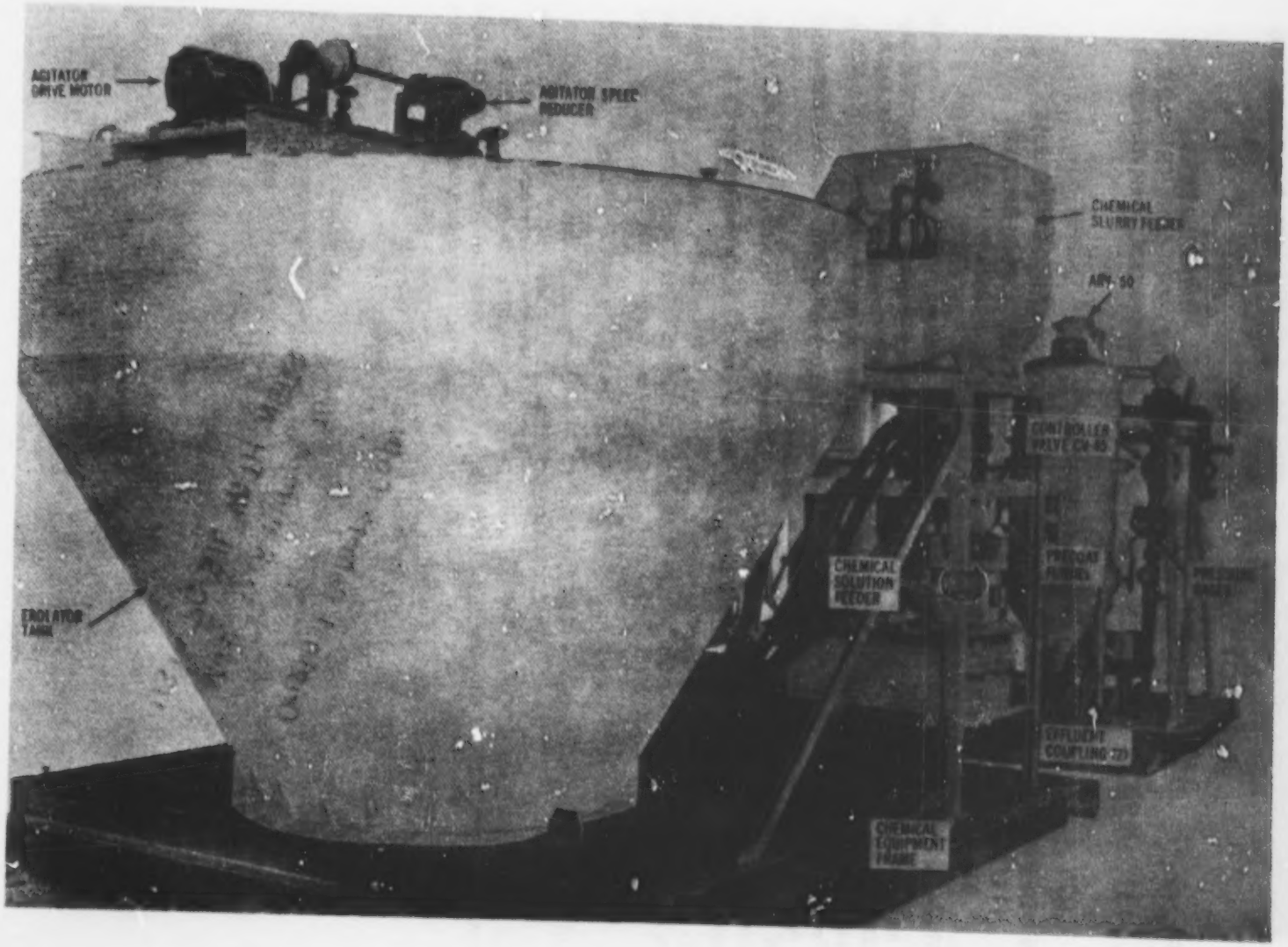


Figure 2.1. Water purification unit, right front three quarter view (serial number range 3000A-113 through 3000A-191 inclusive)

Page 8. Paragraph 5 is superseded as follows:

5. Difference in Models

This manual covers only the Met-Pro Model 3000–2700A water purification unit. Unit differences exist on serial number range 3000A–113 through 3000A–191 inclusive. Such changes occur on the agitator drive speed reducer, the slurry feeder speed reducer, the chemical solution feeder, and the electric harness.

Page 11. Paragraph 7*e*(2), lines 1 and 2 are changed as follows:

Change "figure 5" to read "figures 5 and 5.1"

Page 12. Figure 5.1 is added after figure 5.

Page 13. Figure 6.1 is added after figure 6.

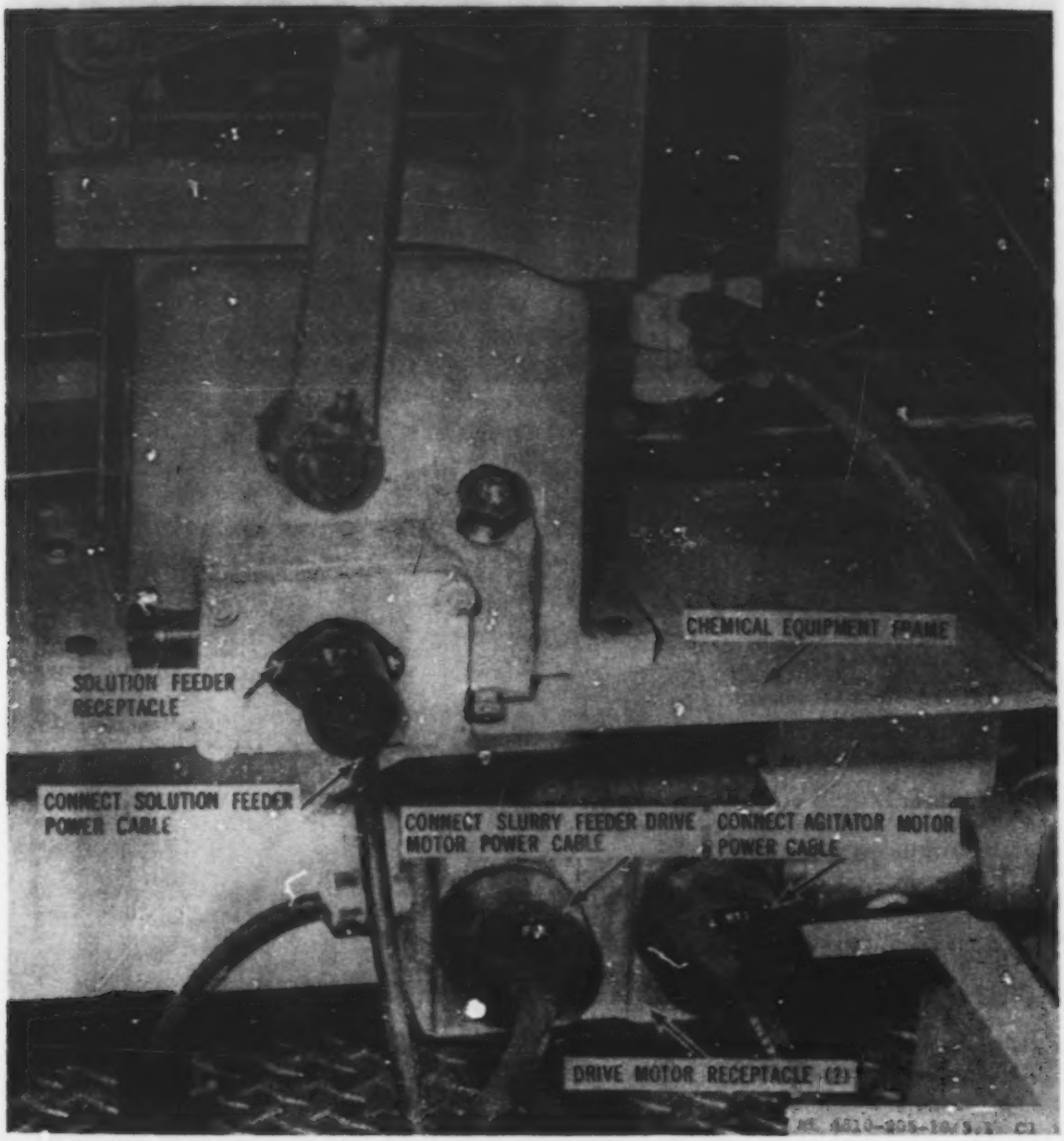

CHEMICAL EQUIPMENT FRAME
SOLUTION FEEDER RECEPTACLE
CONNECT SOLUTION FEEDER POWER CABLE
CONNECT SLURRY FEEDER DRIVE MOTOR POWER CABLE
CONNECT AGITATOR MOTOR POWER CABLE
DRIVE MOTOR RECEPTACLE (2)

Figure 5.1. Slurry and solution feeder and agitator drive motor power cables (serial number range 3000A–113 through 3000A–191 inclusive)

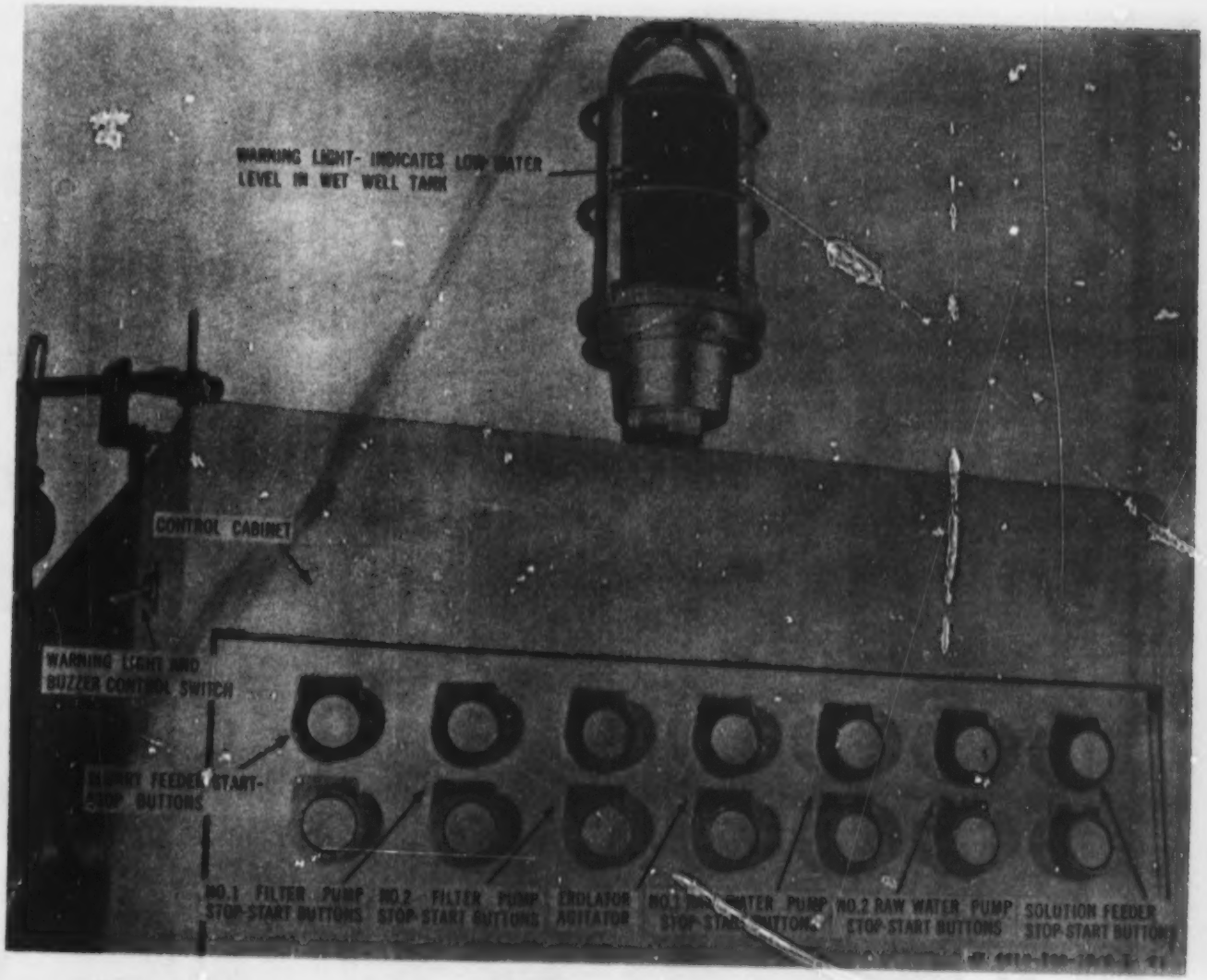


Figure 6.1. Low water level warning light and manually operated electrical controls (serial number range 3000A-113 through 3000A-191 inclusive)

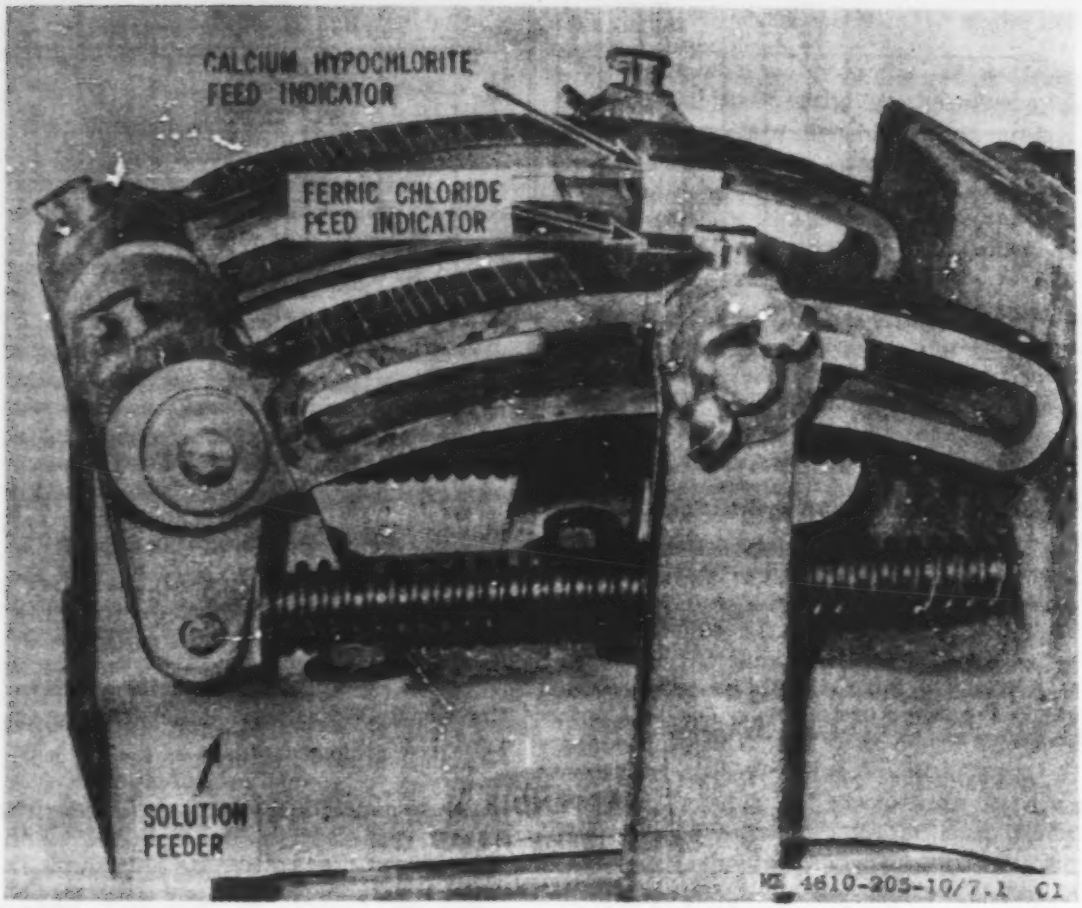


Figure 7.1. Chemical solution feeder feed indicators (serial number range 3000A–113 through 3000A–191 inclusive)

Page 14. Figure 7.1 is added after figure 7.

Page 20. Paragraph 16*a*(4), line 2 is changed as follows:

Change "(fig 2)" to read "(figs 2 and 2.1)". So much of paragraphs 17*c*(1), 17*d*(1), 23*b*(1). 23*b*(2), and 23*b*(5) as read "(fig 11)" is changed to read "(figs 11 and 11.1)". So much of paragraphs 19*c*, 23*b*(1), 23*b*(2), and 23*b*(5) as reads "(fig 15)" is changed to read "(figs 15 and 15.1)".

Page 23. Figure 11.1 is added after figure 11.

Page 27. Figure 15.1 is added after figure 15.

Page 39. Paragraph 31 is superseded as follows:

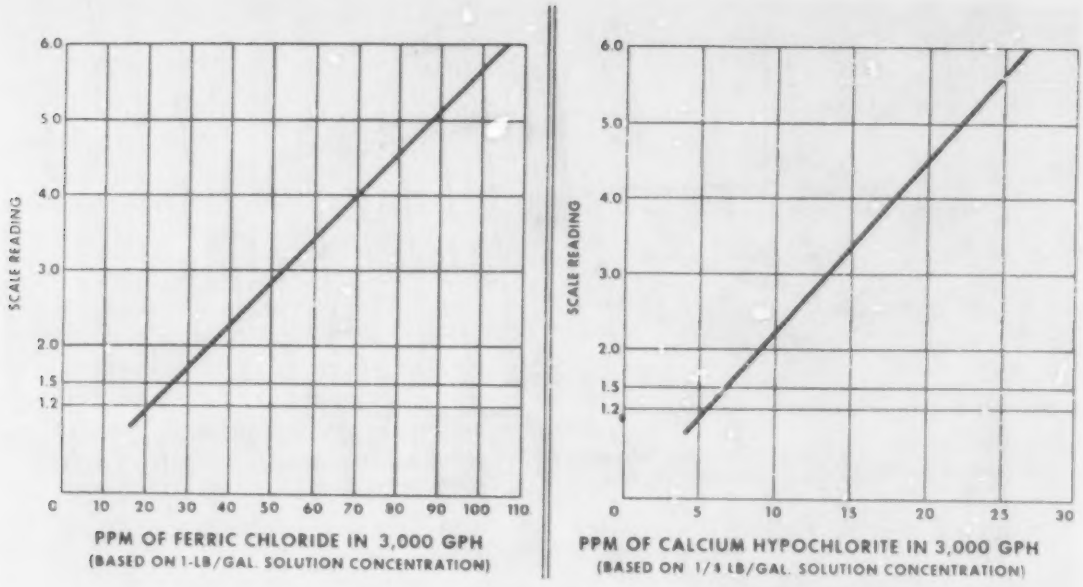


Figure 11.1. Chemical solution calibration charts (serial number range 3000A–113 through 3000A–191 inclusive)

31. General Lubrication Instructions

a. This section contains special instructions which are supplemental to, and not specifically covered in the lubrication order.

b. The lubrication order (LO 5–4610–205–12) is the approved lubrication order for the water purification unit. For the current lubrication order, refer to DA Pam 310–4.

Page 40. Figure 25 ① and 25 ③ are recinded.

Page 42. Figure 25, change "Continued" to read, "Special lubrication points".

Page 58. Paragraph 2 is changed as follows: Change "LO 5–4610–205–20" to read "LO 5–4610–205–12".

Page 60. Appendix II, Basic Issue Items and Maintenance and Operating supplies, is superseded as follows:

APPENDIX II
BASIC ISSUE ITEMS LIST

Section 1. INTRODUCTION

1. Scope

This appendix lists items which accompany the water purification unit or are required for installation, operation, or operator's maintenance.

2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items — Section II. A list of items which accompany the water purification unit or are required for the installation, operation, or operator's maintenance.

b. Maintenance and Operating Supplies — Section III. A listing of maintenance and operating supplies required for initial operation.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR), Column (1).

(1) Source Code, indicates the selection status and source for the listed item. Source code is:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.

Note. Source code and level of maintenance are not shown on common hardware items known to be readily available in Army supply channels and through local procurement.

(2) Maintenance Code, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew

(3) Recoverability Code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable.

b. Federal Stock Number, Column (2). This column indicates the Federal stock number for the item.

c. Description, Column (3). This column indicates the Federal item name and any additional description of the item required. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Issue, Column (4). This column indicates the unit used as a basis of issue, e.g., ea, pr, ft, yd, etc.

e. Quantity Incorporated in Unit Pack, Column (5). This column indicates the actual quantity contained in the unit pack.

f. Quantity Incorporated in Unit, Column (6). This column indicates the quantity of the item used in the functional group.

g. Quantity Furnished With Equipment, Column (7). This column indicates the quantity of an item furnished with the equipment.

h. Quantity Authorized, Column (8). This column indicates the quantity of an item authorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies — Section III

a. Component Application, Column (1). This column identifies the component application of each maintenance or operating supply item.

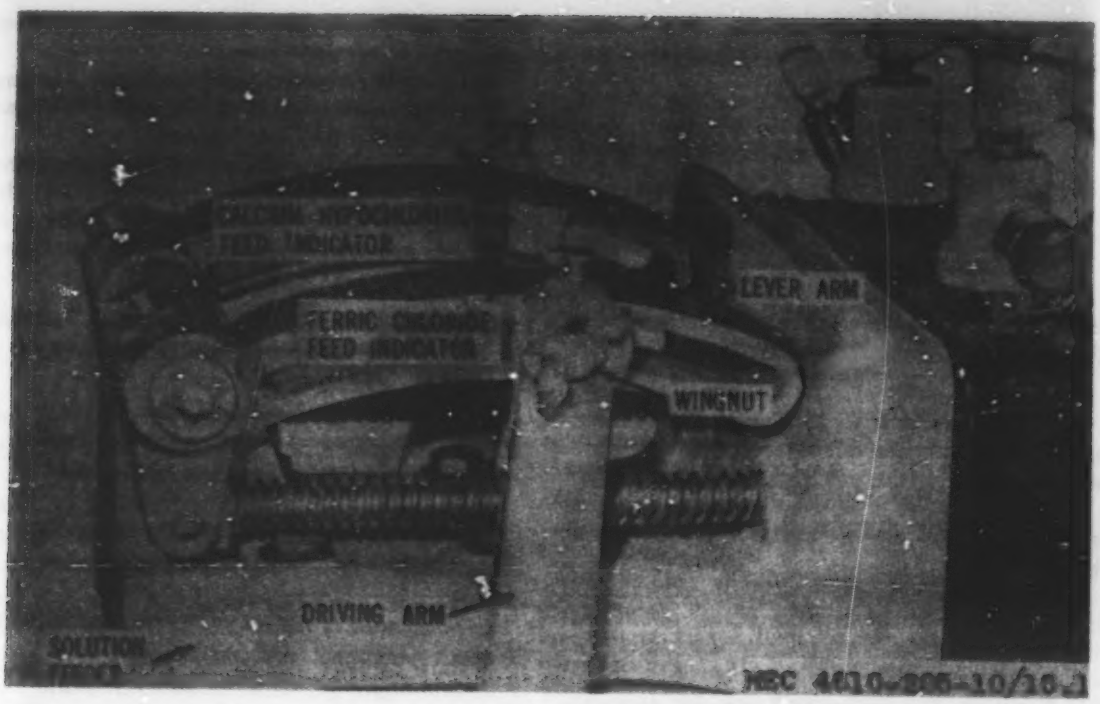
b. Federal Stock Number, Column (2). This column indicates the Federal stock number for the item and will be used for requisitioning purposes.

c. Description, Column (3). This column indicates the item and brief description.

d. Quantity Required for Initial Operation, Column (4). This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours Operation, Column (5). This column indicates the estimated quantities required for an average eight hours of operation.

f. Notes, Column (6). This column indicates informative notes keyed to data appearing in a preceding column.



STEP 1. PRESS SOLUTION FEEDER START BUTTON (FIG. 6.1).

STEP 2. LOOSEN WINGNUTS AND SET FERRIC CHLORIDE FEED INDICATOR AS DETERMINED BY USE OF SOLUTION CALIBRATION CHART. SET CALCIUM HYPOCHLORITE FEED INDICATOR IN A SIMILAR MANNER. TIGHTEN WINGNUTS.

STEP 3. OBSERVE PLASTIC DISCHARGE HOSES. IF SOLUTION IS NOT FLOWING THROUGH HOSES, FEEDER PUMPS HAVE FAILED TO PRIME. HAND PRIME THE PUMPS AS FOLLOWS:

a. PRESS SOLUTION FEEDER STOP BUTTON (FIG. 6.1).

b. REMOVE WINGNUTS AND DISCONNECT DRIVING ARMS FROM LEVER ARMS.

c. OPERATE LEVER ARMS UP AND DOWN RAPIDLY BY HAND UNTIL SOLUTION CAN BE SEEN TO FLOW THROUGH PLASTIC DISCHARGE HOSES.

d. RECONNECT DRIVING ARMS TO LEVER ARMS AND INSTALL WINGNUTS.

e. RESET FEED INDICATORS AS IN STEP 2 ABOVE.

f. PRESS SOLUTION FEEDER START BUTTON (FIG. 6.1).

ME 4610-205-10/15.1 C1

Figure 15.1. Starting chemical solution feeder (serial number range 3000A-113 through 3000A-191 inclusive)

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal stock No.	(3) Description	(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration (a) Fig. No.	(9) Illustration (b) Item No.
		GROUP 31 — BASIC ISSUE ITEMS, MANUFACTURER INSTALLED							
		3100 — BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED							
P C	7510-889-3494	BINDER: LOG BOOK	EA			1	1		
P C	7520-559-9618	CASE: OPERATION AND MAINTENANCE PUBLICATIONS.	EA			1	1		
		DA LUBRICATION ORDER LO 5-4610-205-12	EA			1	1		
		DA TECHNICAL MANUAL TM 5-4610-205-10	EA			1	1		
		GROUP 32 — BASIC ISSUE ITEMS, MANUFACTURER OR TROOP INSTALLED							
		3200 — BASIC ISSUE ITEMS, MANUFACTURER OR TROOP INSTALLED							
P C	4210-881-0531	EXTINGUISHER: FIRE	EA			*		1	

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock No.	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
OIL CAN POINTS	9150-231-6653 9150-265-9433 9150-231-9037 9150-265-9425 9150-242-7602	LUBRICATING OIL: 5-gal pail or 1-qt can as follows: Grade 9250 or OE-30 Grade 9110 or OE-10 OES		(1)	(1) See current LO for grade application and replenishment intervals.
GREASE POINTS	9150-190-0904	GREASE, AUTOMOTIVE AND ARTILLERY GAA, 1 lb can		(1)	
5102 — CHEMICAL SOLUTION FEEDER GEAR CASE	9160-685-0913	INSULATING OIL, ELECTRICAL, 5 gal can	5 qt	(1)	
5102 — CHEMICAL SOLUTION FEEDER	6810-238-8115	CALCIUM HYPROCHLORITE, 5 lb can	1.25 lb	1.25 lb	
	6810-664-0283	FERRIC CHLORIDE, 100 1 lb bags per drum	5 lb	5 lb	
5102 — CHEMICAL SLURRY FEEDER	6110-264-6575	CHARCOAL, ACTIVATED, 5 lb bag	1.4 lb	1.4 lb	
	9390-282-4161	DIATOMACEOUS EARTH, 25 lb bag	7 lb	7 lb	
	9620-585-2017	LIMESTONE, PULVERIZED, 80 lb bag	14 lb	14 lb	
5102 — FILTER	9390-282-4161	DIATOMACEOUS EARTH, 25 lb bag	1½ lb	1½ lb	
5103 — PLUG VALVES	9150-261-8293	GREASE, PLUG, VALVE 24 sticks per box, ACF No. 24 or equal	4 sticks	(1)	

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock No.	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
5109 — SPEED REDUCER FOR ERDLATOR	9150-754-2635	LUBRICATING OIL: 1 qt can as follows: Grade GO-90	7/8 qt	(1)	
	9150-577-5847	LUBRICATING OIL: 5 gal can as follows: Grade GO-140	7/8 qt	(1)	
	9150-261-7904	LUBRICATING OIL: 1 qt can as follows: GOS	7/8 qt	(1)	
5109 — SPEED REDUCER FOR SLURRY FEEDER	9150-754-2635	LUBRICATING OIL: 1 qt can as follows: Grade GO-90	7/8 qt	(1)	
	9150-577-5847	LUBRICATING OIL: 5 gal can as follows: Grade GO-140	7/8 qt	(1)	
	9150-261-7904	LUBRICATING OIL: 1 qt can as follows: GOS	7/8 qt	(1)	

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section I (qty rqr block no. 177) Operator maintenance requirements for Water Purification, Equipment.

TM 5-4610-205-10
C 2

Change
No 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *2 July 1973*

Operator's Manual
WATER PURIFICATION UNIT: BASE MOUNTED; ELECTRIC MOTOR DRIVEN, AC, 115/208 V, SINGLE-PHASE AND 3-PHASE, 60-CYCLE; 3000 GALLONS PER HOUR (MET-PRO MODEL 3000-2700A)
FSN 4610-857-0330

TM 5-4610-205-10, 14 August 1963, is changed as follows:

Page 60. Appendix II is superseded as follows:

APPENDIX II
BASIC ISSUE-ITEMS-LIST-AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items required by the operator for operation of the water purification unit.

2. General

These lists are divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List — Section III. A list of items in alphabetical sequence which, at the discretion of the unit commander, may accompany the water purification unit. These items are not subject to turn-in with the water purification unit when it is evacuated.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of items troop installed or authorized list, section III.

a. Source, Maintenance and Recoverability Code(s) (SMR): Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr; etc.

e. Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock No.	(3) Description	(4) Unit of meas	(5) Qty auth
	7520-559-9618	CASE, MAINTENANCE AND OPERATOR MANUAL.	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 177) Operator Maintenance Requirements for Water Purification

Changes in force: C1, C2, and C3

TM 5-4610-205-10
C 3

Change No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *24 June 1974*

Operator's Manual

WATER PURIFICATION UNIT; BASE MOUNTED; 3000 GPH; ELECTRIC MOTOR DRIVEN, AC, 115/208V, 1-3-PHASE, 60 HERTZ (MET-PRO MODEL 3000-2700A) FSN 4610-857-0330

TM 5-4610-205-10, 14 August 1963, is changed as follows:

The title is changed to read as shown above.

Reverse of Cover Page. Add to safety precautions:

WARNING

Operation of this equipment presents a NOISE HAZARD to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

WARNING

Cleaning solvent, PD-680, is a POTENTIALLY DANGEROUS CHEMICAL. Do not use near an open flame.

Page 1. Under Chapter 2, Section 1 is rescinded.

Page 2. Paragraph 1*d*, the mailing address is changed to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120.

Pages 9 through 11. Chapter 2, section I is rescinded. Appropriate changes will be reflected in the index.

Page 12. Figure 5 is rescinded.

Page 19. After paragraph 15's title, add:

WARNING

Operation of this equipment presents a NOISE HAZARD to personnel in the area. Wear ear muffs or ear plugs which were fitted by a trained professional.

Page 43. Before paragraph 32*c*, add:

WARNING

Drycleaning solvent, PD-680, used for cleaning is a POTENTIALLY DANGEROUS CHEMICAL. Do not use near an open flame. The flash point of solvent is 100° F. - 138° F.

Changes in force: C 1, C 2, C 3, and C 4

TM 5-4610-205-10
C 4

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *29 November 1974*

Operator's Manual
WATER PURIFICATION UNIT; BASE MOUNTED; 3000 GPH; ELECTRIC MOTOR DRIVEN, AC, 115/208 V, 1-3-PHASE, 60 HERTZ (MET-PRO MODEL 3000-2700A)
FSN 4610-857-0330

TM 5-4610-205-10, 14 August 1963, is changed as follows:

Inside Front Cover. Add the following to the list of safety precautions:

CAUTION

WATER PURIFICATION EQUIPMENT SET TURN-IN

Opened or broken packages of chemicals (i.e., ferric-chloride and calcium hypochlorite) are highly caustic and can have a deleterious effect, during extended periods of storage, on the interior surface of the van body and its components.

When turning in a water purification equipment set as unserviceable or excess, the following actions will be taken:

All partially consumed or opened chemicals will be utilized and/or destroyed locally.

All unopened chemicals will be *individually* packaged and *will not be stored* for shipment inside of the water purification unit van body.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 177) Operator Maintenance Requirements for Water Purification.

Changes in force: C 1, C 2, C 3, C 4, and C 5

TM 5-4610-205-10
C 5

CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *29 August 1975*

Operator's Manual

WATER PURIFICATION UNIT; BASE MOUNTED; 3000 GPH; ELECTRIC MOTOR DRIVEN, AC, 115/208 V, 1- AND 3-PHASE, 60 HERTZ (MET-PRO MODEL 3000-2700A) NSN 4610-00-857-0330

TM 5-4610-205-10, 14 August 1963, is changed as follows:

The title is changed as shown above:

Page 2 of cover. Add the following warnings:

WARNING

DANGEROUS CHEMICALS

Do not mix *dry* calcium hypochlorite and *activated* carbon together. They react violently with possible fire or explosion.

WARNING

Do not pressurize the filter section until you have insured that the filter housing clamp assembly and gasket are properly seated and tightened.

Page 2. Paragraph 1*d* is superseded as follows:

d. You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms), and/or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals) located in the back of the manual and mail the forms direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

Page 19, paragraph 16*b*. Add the following warnings:

WARNING

Do not pressurize the filter section without first insuring that the filter housing clamp assembly and gasket are properly seated and tightened.

Page 21, paragraph 17*a*(1). Add the following warning:

WARNING

DANGEROUS CHEMICALS

Do not mix dry calcium hypochlorite and activated carbon together. They react violently with possible fire or explosion.

Paragraph 17*d*(1). Add the following warning:

WARNING

DANGEROUS CHEMICALS

Do not mix dry calcium hypochlorite and activated carbon together. They react violently with possible fire or explosion.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
CoA, 3d ENGINEER BN
FT. LEONARD WOOD MO 63108

DATE: 16 DEC 74

PUBLICATION NUMBER	DATE	TITLE
TM5-6115-200-20 AND P	1 APR 72	GENERATOR SET 10 KW NSN 6115-00-231-7286

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
81		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders

SAMPLE

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER: JOHN DOE, PFC (268) 317-7111

SIGN HERE: John Doe

DA FORM 1 AUG 74 2028-2 (TEST)

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL "FIND," MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG DOTTED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

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DEPARTMENT OF THE ARMY
DOD-314

Commander
U.S. Army Troop Support Command
ATTN: AMSTS-MPP
4300 Goodfellow Boulevard
St. Louis, Missouri 63120

FOLD BACK

TEAR ALONG DOTTED LINE

TEAR ALONG DOTTED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER	DATE	TITLE

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE:

DA FORM 1 AUG 74 2028-2 *(TEST)*

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL "FIND," MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

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U.S. Army Troop Support Command
ATTN: AMSTS-MPP
4300 Goodfellow Boulevard
St. Louis, Missouri 63120

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FOLD BACK

REVERSE OF DA FORM 3938-R (TEST)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

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By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A (qty rqr block No. 177), Operator requirements for Water Purification.

Changes in force: C 1, C 2, C 3, C 4, C 5, and C 6

TM 5-4610-205-10
C 6

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *19 March 1976*

Operator's Manual

WATER PURIFICATION UNIT; BASE MOUNTED; 3000 GPH; ELECTRIC MOTOR DRIVEN, AC, 115/208 V, 1- and 3-PHASE, 60 HERTZ (MET-PRO MODEL 3000-2700A) NSN 4610-00-857-0330

TM 5-4610-205-10, 14 August 1963, is changed as follows:

Page 29, paragraph 22. Immediately after paragraph title, add the following:

CAUTION

This unit retains water in its piping assemblies and is susceptible to *damage from freezing*, if not properly drained.

In order to completely drain the system and avoid the referenced damage, follow the "step by step" draining instructions in *b*(1) through (8) below.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 177), Operator requirement for Water Purification.

TECHNICAL MANUAL
No. 5–4610–205–10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *14 August 1968*

OPERATOR'S MANUAL

WATER PURIFICATION UNIT: BASE MOUNTED; ELECTRIC DRIVEN, AC, 115, 208 VOLT, SINGLE PHASE AND 3 PHASE, 60 CYCLE; 3,000 GALLONS PER HOUR (MET-PRO MODEL 3000–2700A) FSN 4610–857–0330

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the water purification unit is issued. They provide information on the operation, lubrication, and preventive maintenance services of the equipmnt, accessories, and attachments.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the basic issue items authorized the operator of this equipment, and a list of maintenance and operating supplies required for initial operation. The maintenance allocation chart is located in TM 5–4610–205–20.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

d. Report all deficiencies in this manual o DA Form 2028. Submit recommendations fo changes, additions, or deletions to the Com manding Officer, U. S. Army Mobility Suppor Center, ATTN: SMOMS–MM, P.O. Box 11 Columbus 16, Ohio. Direct communication authorized.

e. Report all equipment improvement recom mendations as prescribed by TM 38–750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide o Engineer Equipment).

b. For other record and report forms appli cable to the operator, refer to TM 38–750.

Note. Applicable forms, excluding Standard Form 46, which is carried by the operator, shall be kept in canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

a. General. The Met-Pro Water Purification Unit Model 3000–2700A (figs. 1 and 2) is a base-mounted, semipermanent unit. The primary purpose of the unit is to produce potable and palatable drinking water from fresh water soures at a rate of 3,000 gallons per hour. The purification unit consists of a water treatment section (fig. 1), filter section (fig. 1), and drain tank (fig. 1).

Note. The unit covered in this manual does not include such support equipment as pumps, heaters, storage tanks, and power source.

b. Water Treatment Section. The purpose of the water treatment section is to reduce the organic and suspended matter of raw water to a minimum and produce water suitable for application to the filter section.

(1) *Erdlator tank.* The erdlator tank (fig 2) is a circular funnel shaped unit o one piece aluminum construction, wit a capacity of approximately 930 gal lons. A stub shaft and bearing sup port for the agitator are mounted i the bottom of the tank with a series o short baffles which support the dow comer tube. A port is provided fo drawoff of flocculent slurry to th slurry weir box and another for draw off of clear water to the wet well tank The erdlator tank is also equipped with two drains; an upper one fo partial draining and another for com plete draining. The primary purpos of the erdlator tank is to hyraulically separate the slurry blanket from the

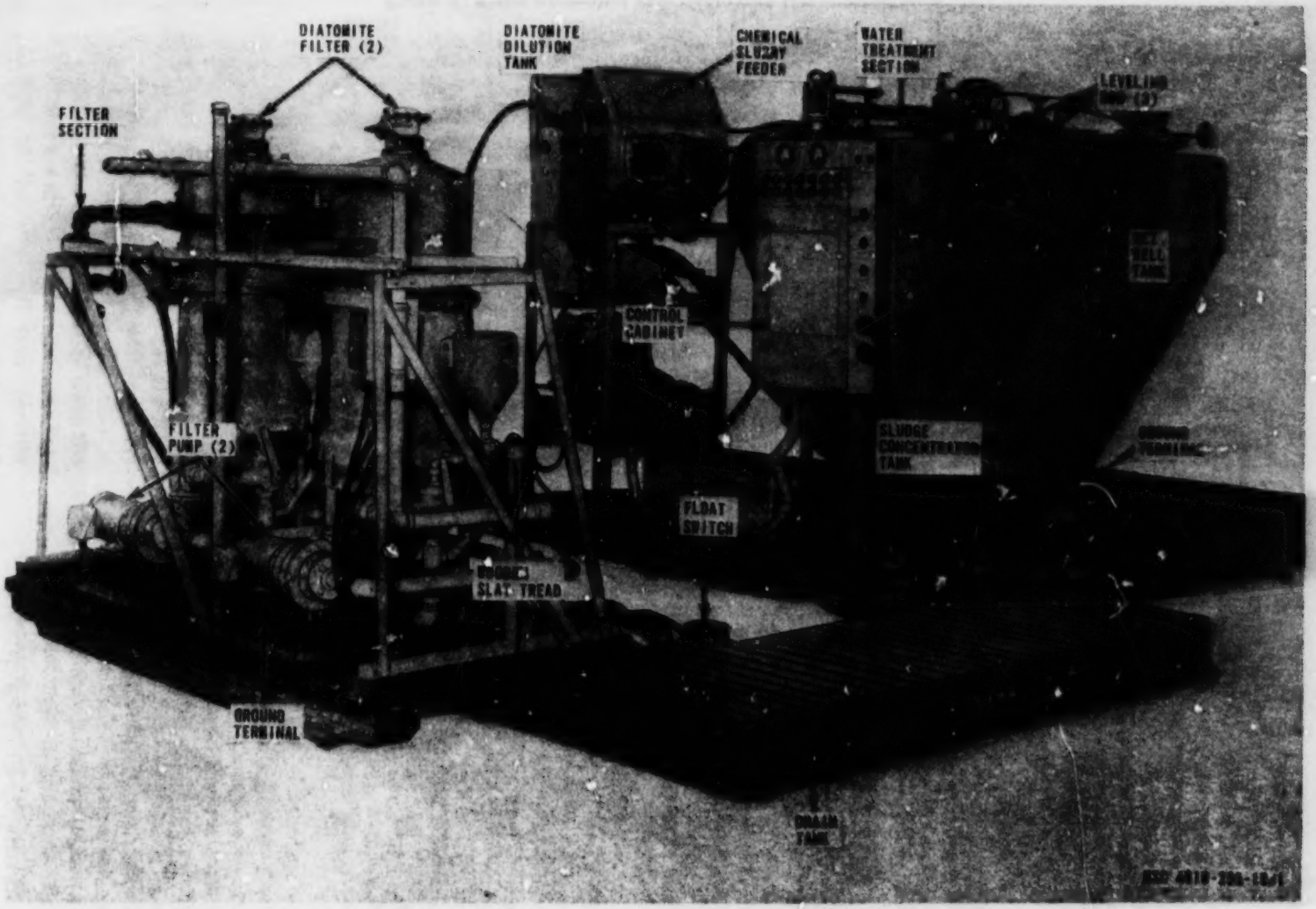
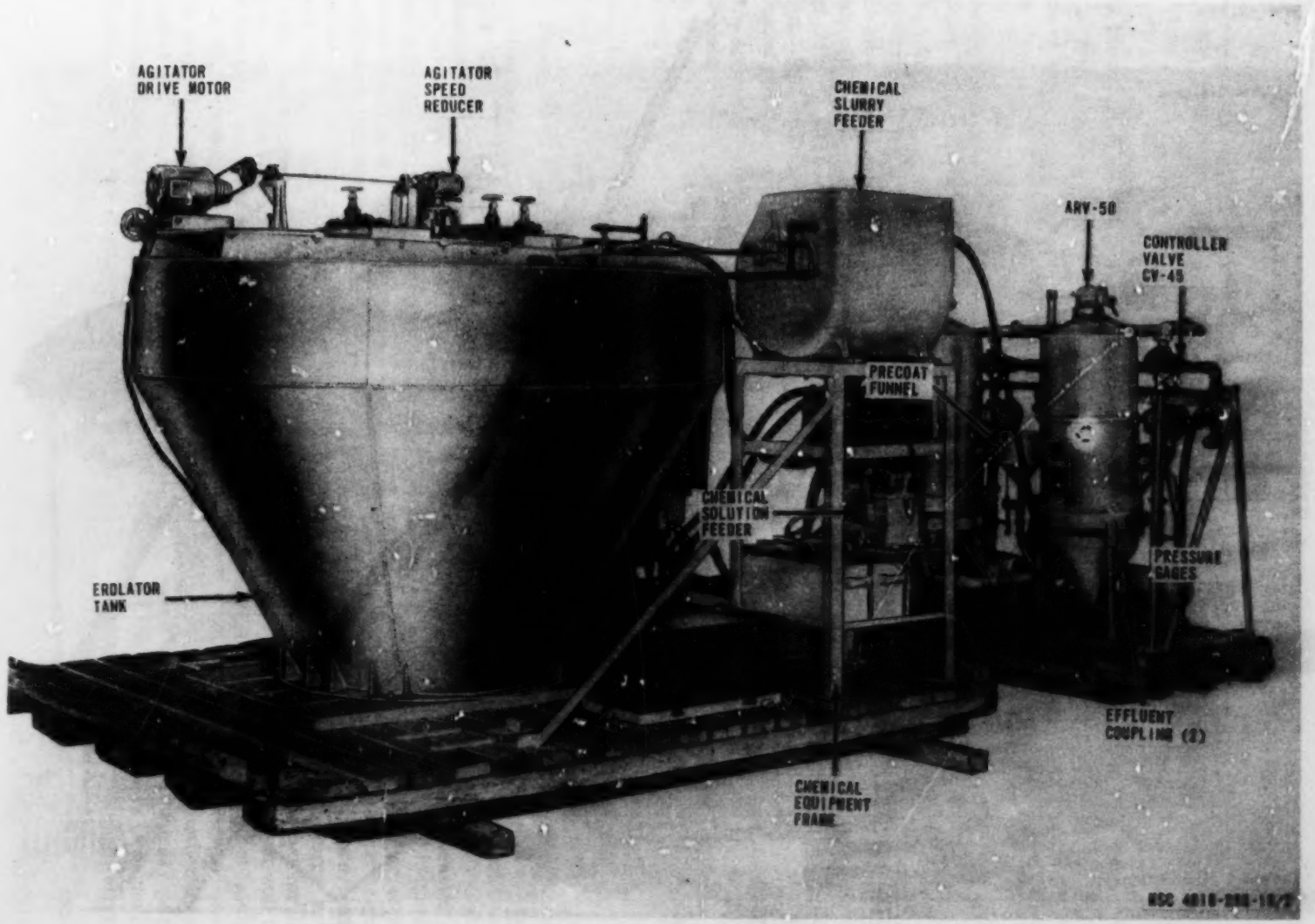


Figure 1. Water purification unit, right front, three-quarter view.


AGITATOR
DRIVE MOTOR
AGITATOR
SPEED
REDUCER
CHEMICAL
SLURRY
FEEDER
ARV-50
CONTROLLER
VALVE
CV-45
PRECOAT
FUNNEL
CHEMICAL
SOLUTION
FEEDER
PRESSURE
GAGES
ERDLATOR
TANK
EFFLUENT
COUPLING (2)
CHEMICAL
EQUIPMENT
FRAME
NSC 4818-288-15/2

AGO 5618

clear water. This separation takes place in the upper part of the tank in what is termed the separator zone. The erdlator tank also serves as a clarifier as the flow of coagulated water is deflected at the bottom of the tank and directed in an upward rotating direction into the clarification zone.

Note. The slurry blanket, sometimes called floc, is the jelly-like curd formed following the addition of the limestone slurry and ferric chloride solution to the raw water as the water is agitated in the erdlator tank. The jelly-like floc first appears as small particles which grow by adherence with other particles. As the water swirls the small particles join with others to enmesh most of the suspended bacteria, dirt, and other organic matter to form a visible slurry blanket. A portion of this slurry blanket is drawn off and flows to the sludge concentrator tank where it forms another slurry blanket.

(2) *Influent launder.* The erdlator tank is equipped with two influent launders (fig. 3). The influent launders are mounted on the bridge rails suspended over the tank. Two aspirators, which are used to aerate the raw water, direct the flow into each influent launder from which the water overflows into the downcomer tube or mixing zone.

(3) *Effluent launder.* The effluent launder (fig. 3) is a circular trough that surrounds the downcomer tube. It is suspended from the bridge rails by three leveling rods (fig. 1). The effluent launder collects clear water from the upper section of the erdlator tank and discharges it into the wet well tank.

(4) *Wet well tank.* The wet well tank (fig. 1) is a triangular tank mounted on the erdlator tank. It has a capacity of approximately 200 gallons and provides limited storage of coagulated water. It also serves as a sump for the filter section. It is equipped with an overflow pipe which permits operation of the erdlator at rated capacity when the filters are stopped. A drain in the bottom of the wet well tank permits drainage of the tank to waste when water unfitted for filtering is obtained from the erdlator.

(5) *Sludge concentrator tank.* The sludge concentrator tank (fig. 1) is a square, funnel-shaped tank mounted on the wet well tank. A smaller circular tank is mounted inside the concentrator tank. The sludge concentrator tank serves as a small auxiliary clarifier by providing a longer holding period for flocculent slurry which it receives from the erdlator tank.

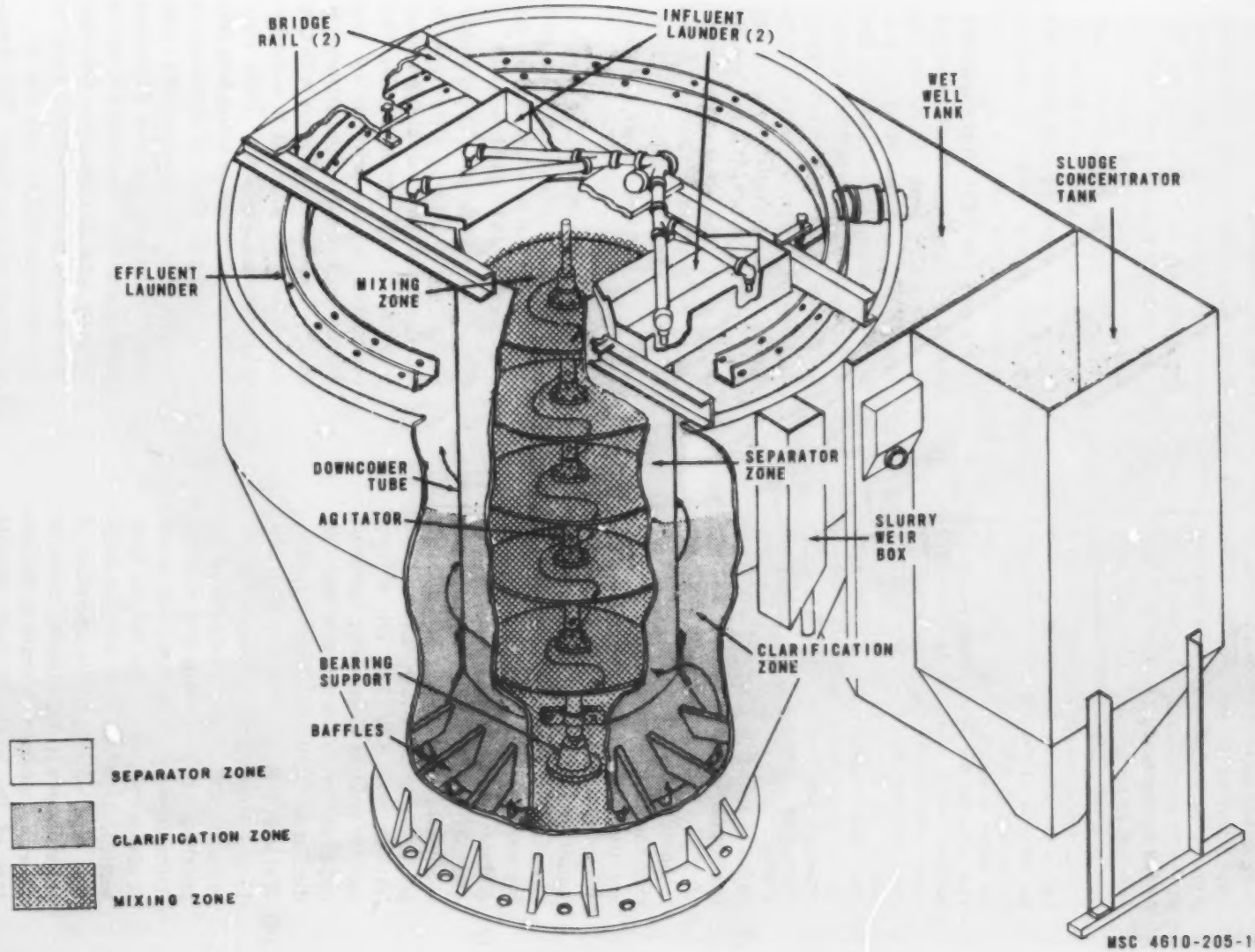
(6) *Slurry weir box.* The slurry weir box (fig. 3) is a small square tank mounted on the erdlator tank. It houses the draw-off port near the top of the erdlator tank and permits the gravity flow of flocculent slurry from the erdlator tank to the sludge concentrator tank.

(7) *Agitator and downcomer tube.* The agitator (fig. 3) consists of a tubular shaft attached to which is five equally spaced disks. The agitator is mounted inside the downcomer tube and forms the mixing zone. The agitator is driven by an electric motor (fig. 2) and speed reducer.

c. Chemical Feed Equipment. The chemical feed equipment is part of the water treatment section and is used to measure and add the desired amount of chemicals to the raw water.

(1) *Chemical slurry feeder.* The chemical slurry feeder (figs. 1 and 2) is an aluminum tank divided into two equal watertight compartments. The two compartments are covered by one hinged door. Each compartment is equipped with four agitators with two measuring cups attached to diametrically opposed agitators. Each compartment functions as a separate unit permitting two different chemicals to be mixed and fed simultaneously. One side of the feeder supplies pulverized limestone slurry (coagulate aid) to the erdlator tank and the other side supplies diatomite slurry (filtering aid) to the diatomite dilution tank (fig. 1).

(2) *Chemical solution feeder.* The chemical solution feeder (fig. 2) is con-


BRIDGE RAIL (2)
INFLUENT LAUNDER (2)
WET WELL TANK
SLUDGE CONCENTRATOR TANK
EFFLUENT LAUNDER
MIXING ZONE
DOWNCOMER TUBE
SEPARATOR ZONE
AGITATOR
SLURRY WEIR BOX
CLARIFICATION ZONE
BEARING SUPPORT
BAFFLES
SEPARATOR ZONE
CLARIFICATION ZONE
MIXING ZONE
MSC 4610-205-10/3

AGO 5

structed of material having anticorrosive resistance and is mounted on the first shelf of the chemical equipment frame. It consists of two diaphragm pumps operated from one electrical motor by means of a gear reduction system. The chemical solution feeder pumps ferric chloric and calcium hypochlorite solution from two chemicals tanks into the mixing zone of the erdlator.

d. Control Cabinet. The control cabinet (fig. 1) is mounted on the sludge concentrator tank and houses the controls and instruments necessary for operation of the water purification unit.

e. Drain Tank. The drain tank (fig. 1) is a rectangular tank covered by a wooden slat tread. Its primary purpose is to collect waste water from the water treatment section and the filter section. The drain tank is equipped with a level control switch for activating a discharge pump.

f. Filter Section. The purpose of the filter section (fig. 1) is to further reduce the suspended matter content of the water received from the water treatment section.

(1) *Diatomite filters.* The filter contains two diatomite filters (fig. 1) specifically designed to employ the filtration properties of diatomaceous earth. Each filter is essentially a two-part cylinder containing six filter elements. Each filter is equipped with two pressure gages (fig. 2) for indicating the pressure on the influent and effluent side of the filters, a precoat funnel for adding prepared diatomite flurry for precoating the filter elements, and an air release valve for releasing air trapped in the filter.

(2) *Controller valve.* A flow controller valve (fig. 2) is located in the effluent filtered water line of each filter to maintain a fixed constant rate of flow through the filter.

(3) *Filter pumps.* The filter section contains two filter pumps (fig. 1) used to pump coagulated water through the filters.

g. Piping and Valves. The unit is equipped with piping and valves painted in four different colors. These colors indicate the purification stage of the water flowing through them: Black indicates raw water, yellow indicates coagulated water, red indicates waste water, and green indicates filtered water.

4. Identification and Tabulated Data

a. Identification. The water purification unit has nine identification plates.

(1) *Corps of Engineers plate A.* Located on the left side of the wet well tank. It specifies nomenclature, make, model, serial number, and dimensions and weight.

(2) *Corps of Engineers plate D.* Located on the filter section and drain tank. They specify nomenclature, make, model, serial number, and Federal stock number.

b. Tabulated Data.

(1) *Corps of Engineers plate A.*

Nomenclature	Water Purification Unit, base mounted, electric motor driven, 3000 gph.
Stock No.	4610–857–0330
Serial	
Manufacturer	Met-Pro Inc.
Model	3000–2700–A
Contract No.	
Date manufactured	
Length	121 in. (inch)
Width	98 in.
Height	90 in.
Shipping weight	3625 lb (pound)
Cube	809 cu in. (cubic inches)

(2) *Corps of Engineers plate D.*

Federal stock number	4610–857–0330
Nomenclature	Filter section
Make	Met-Pro Inc.
Model	3000–2700–A
(For use with)	
Nomenclature	Water purification unit
Federal stock number	4610–857–0330
Model	3000–2700–A
Make	Met-Pro Inc.

(3) *Corps of Engineers plate D.*

Federal stock number	4610–857–0330
Nomenclature	Waste tank
Make	Met-Pro Inc.
Model	3000–2700–A
Serial number	
(For use with)	
Nomenclature	Water purification unit

Federal stock number.....4610–857–0330
Model.....3000–2700–A
Make.....Met-Pro Inc.

(4) *Water purification unit.*

Manufacturer.....Met-Pro Inc.
Model.....3000–2700–A
Capacity.....3000 gph (gallons per hour).
Voltage.....115/208
Phase.....3 phase, 4 wire

(5) *Diatomite filters.*

Manufacturer.....Met-Pro Inc.
Model.....Ft3000A
Type.....Diatomite

(6) *Rate of flow indicator.*

Manufacturer.....Baron Instrument Corp.
Model.....226
Flow rates.....0 to 50 gpm (gallon per minute)
Length.....4½ in.
Diameter.....3¼ in.
Service working pressure.....400 lb

(7) *Diatomite filter pressure gage.*

Manufacturer.....United States Gauge Co.
Type.....500S
Mounting.....flush
Size connection.....¼ in. npt (national pipe threads).
Dial.....2½ in.
Range.....0 to 100 psi (pounds per square inch).

(8) *Aspirator manifold pressure gage.*

Manufacturer.....United States Gauge Co.
Type.....500S
Size connection.....¼ in. npt
Dial.....3½ in.
Range.....0 to 30 psi

(9) *Ammeter.*

Manufacturer.....Simpson Electric Co.
Model.....55S
Current.....alternating
Type.....MR 36 WO 50 ACAAR
Size.....3½ in.
Amperes.....0 to 50

(10) *Voltmeter.*

Manufacturer.....Simpson Electric Co.
Model.....55S
Current.....alternating
Size.....3½ in.
Amperes.....0 to 300
Type.....MR 36 W 300 ACVVR

(11) *Low water level warning light.*

Manufacturer.....Russell and Stoll Co.
Plug size.....½ in.
Lamp size.....50 to 100 watt
Base size.....medium

(12) *Dimensions and weight.*

(a) *Water treatment section.*

Crated:
- Length.....132 in.
- Width.....100½ in.
- Height.....91½ in.
- Weight.....5,310 lb

Uncrated:
- Length.....132 in.
- Width.....98 in.
- Height.....90 in.
- Weight.....3,625 lb

(b) *Filter section.*

Crated:
- Length.....97 in.
- Width.....44 in.
- Height.....85 in.
- Weight.....2,550 lb

Uncrated:
- Length.....92 in.
- Width.....38½ in.
- Height.....67½

(13) *Capacities.*

Erdlator tank	930 gal
Wet well tank	200 gal
Slurry feeder (each compartment).	14 gal
Sludge concentrator tank	180 gal
Chemical solution tanks (each).	5 gal
Water production rate	3000 gph
Water rise rate at 3,000 gph.	1.22 gpm per sq ft (per square feet).
Water treatment time at 3,000 gpm.	18.6 minutes

5. Differences in Models

This manual covers only the Met-Pro Model 3000–2700A Water Purification Unit. No known unit differences exist for the model covered by this manual.

CHAPTER 2
INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Inspection and Servicing Equipment

a. Inspection.

(1) *General.* Make a visual inspection of entire unit making sure that all necessary components are present and in working condition.

(2) *Control cabinet.* Open the control cabinet and inspect all components for ease of operation, insecure mounting, loose electrical connections, and other damage.

(3) *Agitator and slurry feeder drive motors.* Turn the drive motors by hand to make sure that they operate freely without binding. Inspect for loose mounting hardware and electrical connections.

(4) *Piping, hoses, and valves.* Inspect all piping and hoses for loose connections, cracks, and other damage that might have been incurred during shipment. Inspect all valves for freedom of operation.

(5) *Gages and meters.* Inspect all gages and meters for loose mounting, cracked or broken glass, and other damage.

(6) *Diatomite filters.* Inspect the filters for cracks, breaks, loose mounting, and other damage. See that the plastic sleeves are present and in serviceable condition.

(7) *Filter pumps.* Inspect the filter pumps for binding by turning the pumps by hand. Inspect for loose mounting, loose electrical connections, and other damage.

(3) *Drain tank.* Inspect the drain tank for leaks, broken tread, and damaged float switch.

b. Servicing.

(1) Lubricate the water purification unit in accordance with the current lubrication order.

(2) Perform the daily preventive maintenance services (par. 34).

7. Installation or Setting-Up Instructions

a. Location. Locate the water purfication unit so as to take advantage of natural barriers. Select a site that is solid and as level as possible. See that adequate space is available for locating and installing the various components of the unit and that the raw water supply is not over 50 feet away.

Note. Do not locate the unit near a bathing area or sewer outlet.

b. Indoor Installation. If the water purification unit is to be set up indoors, make sure that adequate ventilation is available. Allow sufficient area on all sides of the unit for easy access to all components. In the event that the enclosure has a floor, make sure the floor is of sufficient construction to support the weight of the unit.

c. Grounding. The water treatment section and the filter section are each equipped with ground terminal studs (fig. 1) and must be grounded before operation. The ground can be, in order of preference, an underground metallic water piping system, a driven metal rod, or a buried metal plate. A ground rod must be $\frac{3}{8}$ inch in diameter if hollow, or $\frac{5}{8}$ inch if solid, and must be driven to a depth of at least 2 feet. A ground plate must have a minimum area of 9 square feet and be buried at a depth of at least 4 feet. The ground cable must be a No. 6 AWG (American Wire Gage) copper wire and be bolted or clamped to the rod, plate, or piping

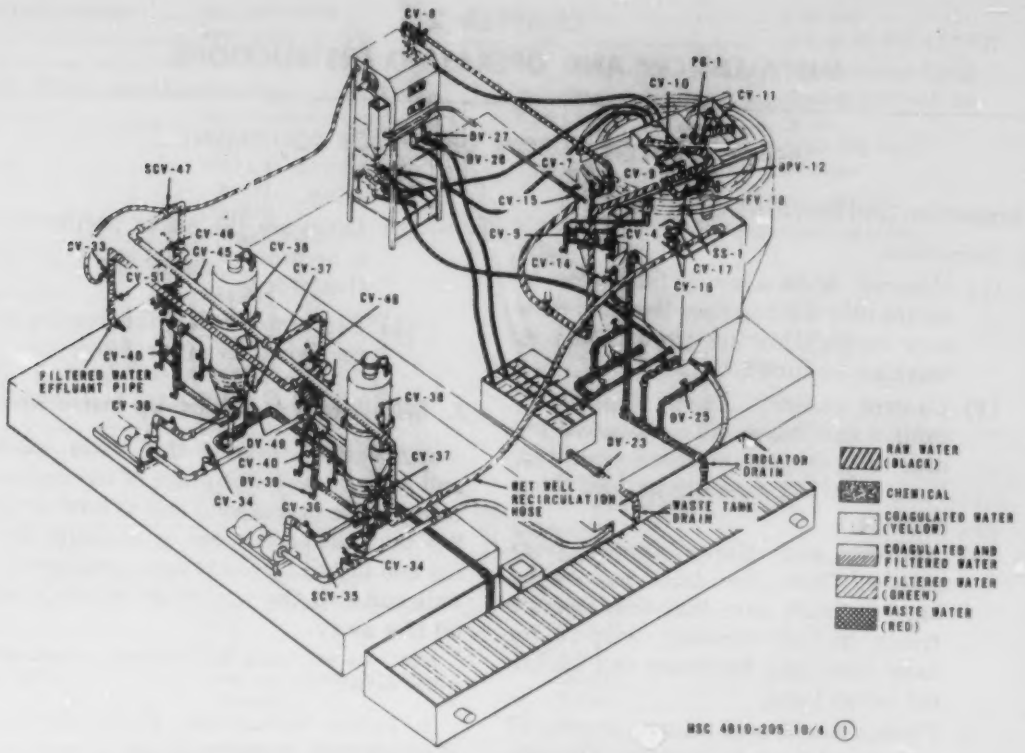


Figure 4. Water purification unit—typical flow diagram.

system. Connect the other end of the ground cable to the ground terminal.

Warning: **Do not operate the water purification unit without suitable ground connection. Electrical defects in the unit load lines or load equipment can cause death by electrocution when contact is made with an ungrounded system.**

d. Piping and Hoses.

(1) Connect the water purification unit to a source of raw water.

(2) Connect the two filtered water effluent pipes (fig. 2) leading from the diatomite filters.

(3) Install the wet well recirculation and effluent hoses as shown in figure 4.

(4) Refer to figure 4 and install the slurry feeder filtered water hose. Connect a filtered water discharge hose to the filtered water effluent piping.

(5) Refer to figure 4 and install the waste water drains.

Warning: **Provide adequate drainage so that water will not accumulate around the unit and supporting electrical equipment. Make sure that waste water drains do not flow into the source of raw water.**

e. Electrical Connections.

(1) *General.* The water purification unit comes equipped with three 50-foot extension cables which may be used if electric driven supply and discharge pumps are used with the unit. Receptacles, located in the control cabinet, are provided to supply power to these units.

Warning: **Before making any electrical connections, make sure all switches are off and that the power source cable is not energized.**

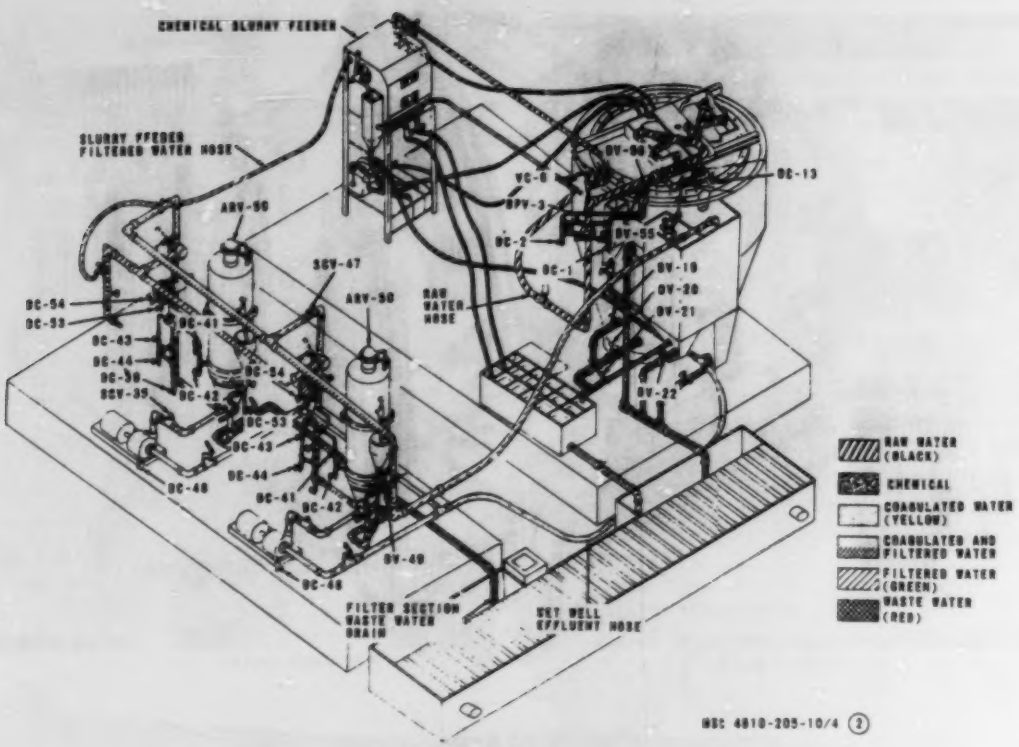


Figure 4—Continued.

(2) *Electrical connections.* Refer to figure 5 and install the electrical cables.

8. Movement to a New Worksite

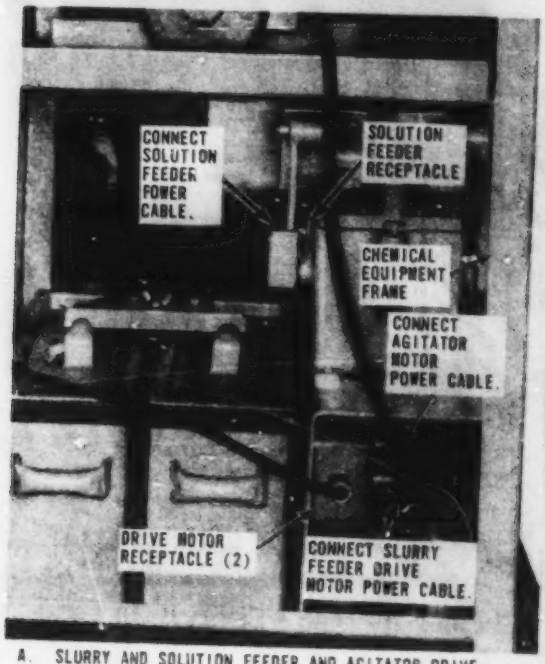
a. Preparation for Movement.

(1) Refer to paragraphs 21 and 22 and drain the water treatment and filter sections, as necessary.

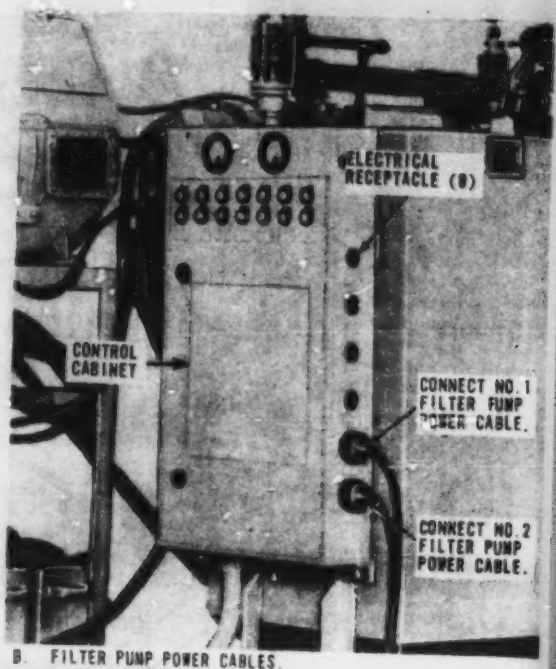
(2) Refer to paragraph 7 and disconnect and stow all piping, hoses, and electrical cables.

(3) Make sure all tools and equipment issued with the unit are clean and properly stowed.

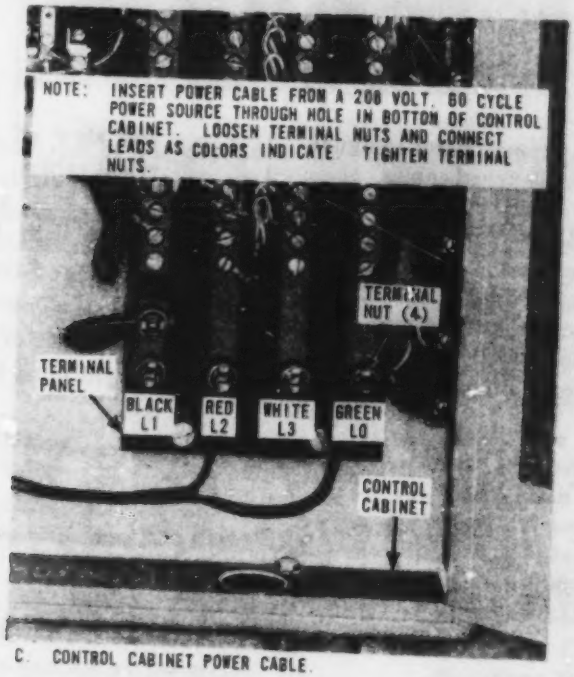
b. Movement. The water purification unit may not be skidded or towed to the new worksite. Movement must be by suitable carrier.


CONNECT SOLUTION FEEDER POWER CABLE.
SOLUTION FEEDER RECEPTACLE
CHEMICAL EQUIPMENT FRAME
CONNECT AGITATOR MOTOR POWER CABLE.
DRIVE MOTOR RECEPTACLE (2)
CONNECT SLURRY FEEDER DRIVE MOTOR POWER CABLE.

A. SLURRY AND SOLUTION FEEDER AND AGITATOR DRIVE MOTOR POWER CABLES.



B. FILTER PUMP POWER CABLES.


NOTE: INSERT POWER CABLE FROM A 208 VOLT, 60 CYCLE POWER SOURCE THROUGH HOLE IN BOTTOM OF CONTROL CABINET. LOOSEN TERMINAL NUTS AND CONNECT LEADS AS COLORS INDICATE. TIGHTEN TERMINAL NUTS.
TERMINAL NUT (4)
TERMINAL PANEL
BLACK L1
RED L2
WHITE L3
GREEN LO
CONTROL CABINET

C. CONTROL CABINET POWER CABLE.

NSC 4610-205-10/5

Figure 5. Water purification unit electrical connections.

Section II. CONTROLS AND INSTRUMENTS

9. General

This section describes, locates, illustrates, and furnishes the operator sufficient information about the various controls and instruments for proper operation of the water purification unit.

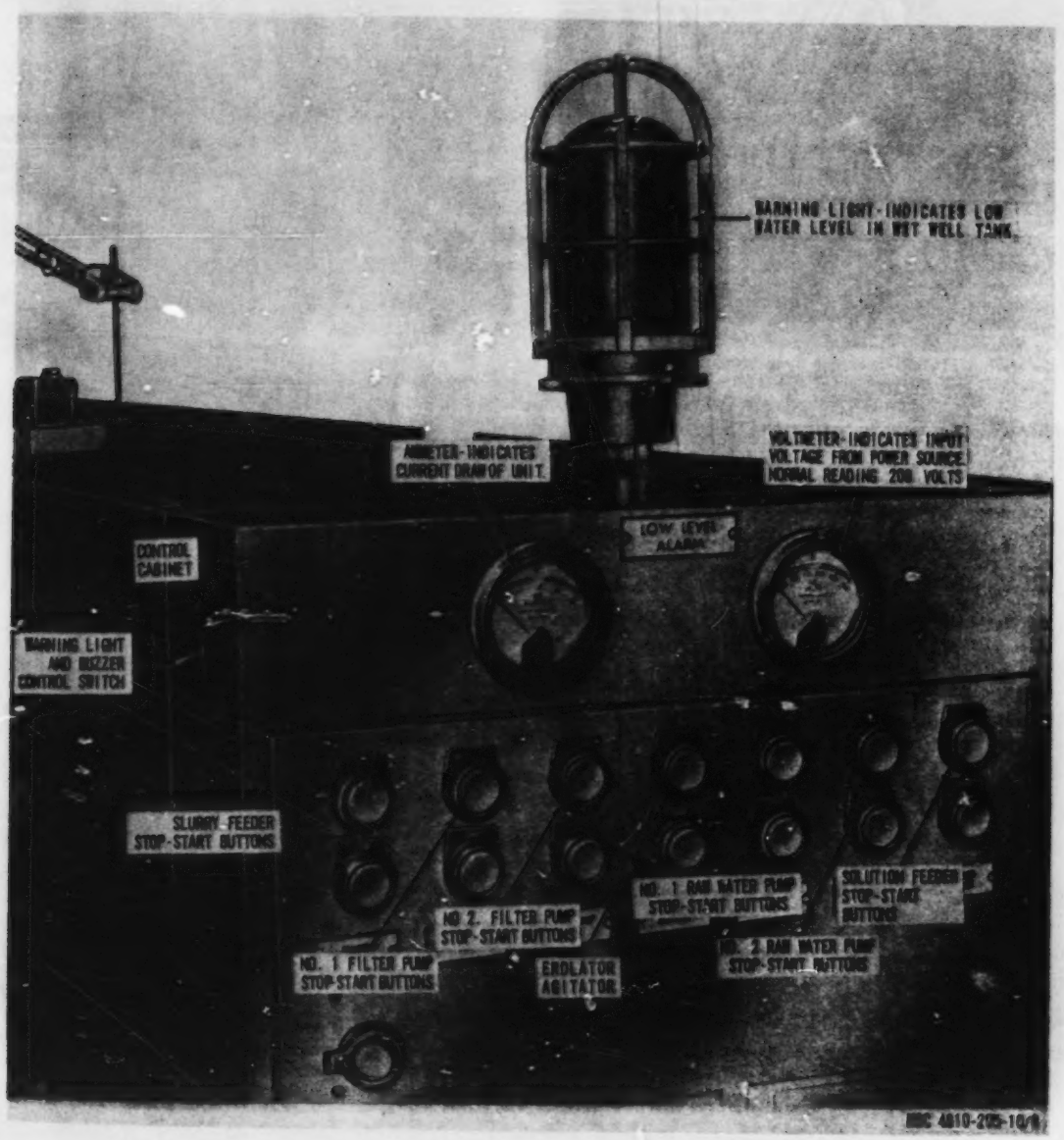
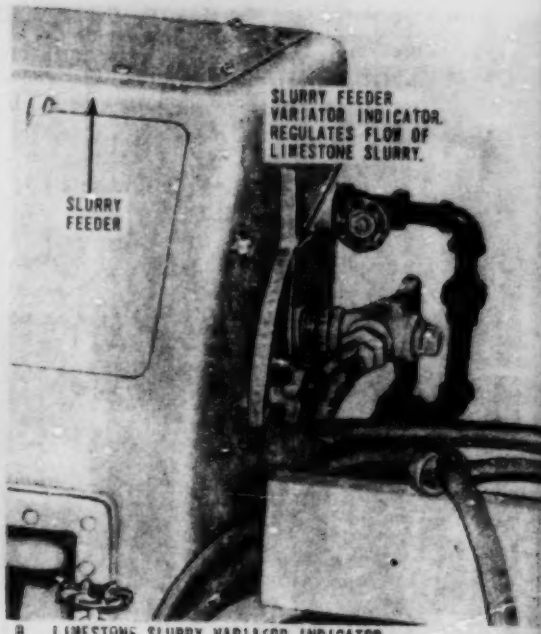

WARNING LIGHT-INDICATES LOW WATER LEVEL IN WET WELL TANK
AMMETER-INDICATES CURRENT DRAW OF UNIT
VOLTMETER-INDICATES INPUT VOLTAGE FROM POWER SOURCE NORMAL READING 208 VOLTS
LOW LEVEL ALARM
CONTROL CABINET
WARNING LIGHT AND BUZZER CONTROL SWITCH
SLURRY FEEDER STOP-START BUTTONS
NO. 2 FILTER PUMP STOP-START BUTTONS
NO. 1 FILTER PUMP STOP-START BUTTONS
ERDLATOR AGITATOR
NO. 1 RAW WATER PUMP STOP-START BUTTONS
SOLUTION FEEDER STOP-START BUTTONS
NO. 2 RAW WATER PUMP STOP-START BUTTONS

Figure 6. Voltmeter, ammeter, low water level warning light and manually operated electrical controls.

A. DIATOMITE SLURRY VARIATOR INDICATOR.



B. LIMESTONE SLURRY VARIATOR INDICATOR.

C. CHEMICAL SOLUTION FEEDER FEED INDICATORS.

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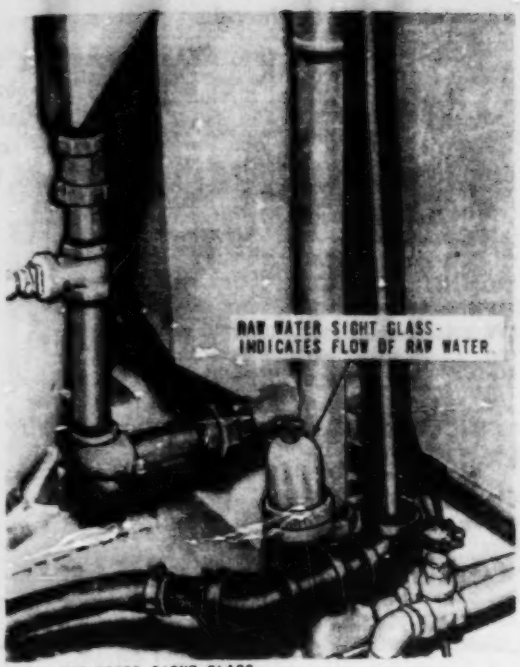
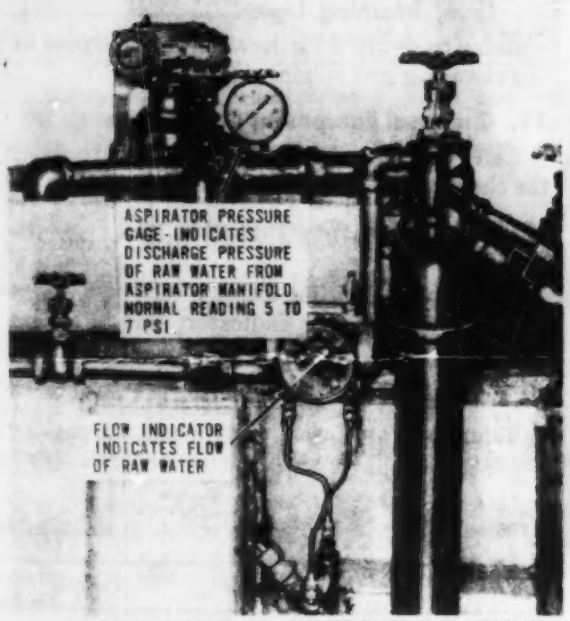
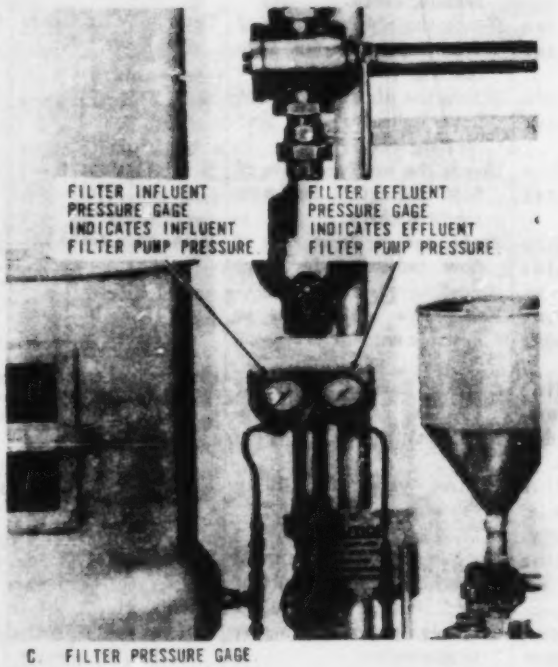
Figure 7. Chemical slurry feeder and solution feeder controls.



A. RAW WATER SIGHT GLASS



B. ASPIRATOR PRESSURE GAGE AND RAW WATER FLOW INDICATOR.



C. FILTER PRESSURE GAGE

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Figure 8. Sight glass, flow indicator, and pressure gages.

10. Voltmeter, Ammeter, and Low Water Level Warning Light

Refer to figure 6 for location and purpose of the voltmeter and ammeter.

11. Chemical Equipment Controls

Refer to figure 7 for location and purpose of the chemical equipment controls.

12. Sight Glass, Flow Indicator, and Pressure Gage

Refer to figure 8 for location and purpose of the sight glass, flow indicator, and pressure gage.

13. Manually Operated Electrical Controls

Refer to figure 5 for location and purpose of the manually operated electrical controls.

14. Valves and Draincocks

Table I furnishes information pertaining to the valves and draincocks necessary for control and operation of the water purfication unit. Refer to figure 4 for location of the valves and draincocks. The following symbols are used to identify the valves and draincocks:

ARV---------- Air release valve
CV---------- Control valve
DC---------- Draincock
BPV---------- Bypass valve
DV---------- Drain valve
VC---------- Vent cock
PP---------- Pipe plug
FV---------- Float valve
SCV---------- Swing check valve

Table I. Valves and Draincocks

Symbol	Location	Function	Type and size	Start position	Operating position
DC–1	Raw water line flow indicator manifold.	Bleeds the air from rate of flow indicator for zero reading check.	Type A, ¼ in. brass draincock.	Closed	Closed
DC–2	Raw water line flow indicator manifold.	Bleeds the air from rate of flow indicator for zero reading check.	Type A, ¼ in. brass draincock.	Closed	Closed
BPV–3	Raw water line flow indicator manifold.	Bleeds the air from rate of flow indicator for zero reading check.	¼ in. gate valve ---	Closed	Closed
CV–4	Raw water line flow indicator manifold.	Bleeds the air from rate of flow indicator for zero reading check.	¼ in. gate valve ---	Open	Open
CV–5	Raw water line flow indicator manifold.	Bleeds the air from rate of flow indicator for zero reading check.	¼ in. gate valve ---	Open	Open
VC–6	Raw water line to slurry feeder.	Vents raw water line to assist complete drainage.	Type A, ⅛ in. brass draincock used as vent.	Closed	Closed
CV–7	Raw water line to limestone slurry feeder compartment.	Controls flow of raw water used for dilution of limestone slurry.	⅛ in. gate valve --	Open	Partially open
CV–8	Raw water line to slurry feeder tank.	Control valve for filling limestone slurry tank.	⅛ in. gate valve --	Open	Closed
CV–9	Raw water line to manifold aspirator.	Main raw water influent valve for filling erdlator tank.	2 in. gate valve ---	Open	Open
CV–10	Raw water influent line to aspirator.	Controls flow of raw water to aspirator.	1½ in. gate valve -	Open	Open
CV–11	Raw water influent line to aspirator.	Controls flow of raw water to aspirator.	1½ in. gate valve -	Open	Open
BPV–12	Raw water level alarm piping.	Controls raw water rate of flow to erdlator tank.	1½ in. gate valve -	Closed	Partially open

Table I. Valves and Draincocks—Continued

Symbol	Location	Function	Type and size	Start position	Operating position
DC–13	Raw water level alarm piping.	For draining of line	Type A, ½ in. brass draincock.	Closed	Closed
CV–14	Coagulated water line from slurry take off weir box to sludge concentrator.	Permits drainage of sludge	1½ in. gate valve	Closed	Closed
CV–15	Coagulated water line from erdlator tank to diatomite dilution box.	Supplies coagulated water for mixing chemicals.	Boiler drain valve ½ in. male.	Closed	Closed
CV–16	False bottom of the sludge concentrator tank.	Controls waste water sludge drawoff without loss of clear water.	Orifice plug valve (long pull rod).	Open	Open
CV–17	In sludge concentrator tank.	Controls flow of coagulated water to wet well.	Orifice plug valve (short threaded rod).	Partially open	Partially open
FV–18	Raw water level alarm assembly.	Controls water level in wet well.	1½ in. flow valve	Closed	Closed
DV–19	Upper drain line from bottom of erdlator.	Partially drains erdlator tank for short shutdown.	2 in. gate valve	Closed	Closed
DV–20	Lower drain line from bottom of erdlator tank.	Drains erdlator tank completely.	2 in. gate valve	Closed	Closed
DV–21	Drain line from concentrator tank.	Controls the amount of sludge drawoff, drain concentrator.	1 in. gate valve	Closed	Partially open
DV–22	Drain line from concentrator.	Drain concentrator tank completely.	1 in. gate valve	Closed	Closed
DV–23	Drain line from waste tank.	Drain waste tank	1 in. gate valve	Open	
SCV–24	Drain line from wet well.	Prevents backward flow of water into wet well.	2 in. horizontal check valve.	Closed	Closed
DV–25	Drain water line from wet well.	Drains wet well	2 in. gate valve	Open	Closed
DV–26	Drain line from chemical slurry feeder tank.	Drain diatomaceous earth slurry compartment.	¾ in. gate valve	Closed	Closed
DV–27	Drain line from chemical slurry feeder tank.	Drains limestone slurry compartment.	¾ in. gate valve	Closed	Closed
PP–28	Front of slurry feeder tank diatomite compartment.	Check high level mark of diatomite compartment of slurry tank.	Type A, pipe plug	Closed	Closed
CV–33	Slurry feeder filtered water line.	Supplies filtered water for mixing chemicals.	Boiler drain valve ½ in. male; ¾ in. male.	Closed	Open
CV–34	Coagulated water line to suction side of filter water pump.	Controls flow of coagulated water to filter pump.	1½ in. quick acting gate valve.	Open	Open

Table Valves and Draincocks—Continued

Symbol	Location	Use	Type and size	Start position	Operating position
LSCV–35	Coagulated water line from filter pump to influent plug valve.	Preven[illegible] water [illegible]	[illegible]	[illegible]	Open
CV–36	Coagulated water line from filter pump to influent side of filter.	Control[illegible] water [illegible] washing.	[illegible] turn.	[illegible]	[illegible]
CV–37	Coagulated water line below precoat funnel filter.	Diatomite slurry filling control valve to filter.	[illegible] gate valve	Open	Closed
CV–38	Air vent line on influent side of filter.	Filter air vent	[illegible] angle valve	Open	Open
DV–39	Recirculation filter line below gate valve CV–40.	Drains recirculation filtered water line.	[illegible] gate valve	Closed	Closed
CV–40	Recirculation filter line below flow controller valve CV–45.	Starts and stops flow of water from filter.	[illegible] gate valve	Closed	Open
DC–41	Influent filter pressure gage line.	Cut off water pressure to influent gage.	Type E, ¼ in. brass draincock.	Open	
DC–42	Influent filter pressure gage line.	Drain filter influent gage and piping.	Type A, ¼ in. brass draincock.	Open	
DC–43	Effluent filter pressure gage line.	Cut off water pressure to effluent gage.	Type E, ¼ in. brass draincock.	Open	Open
DC–44	Effluent filter pressure gage.	Drains filter effluent gage and piping.	Type A, ¼ in. brass draincock.	Closed	Closed
CV–45	Recirculation filter line below effluent plug valve CV–46.	Controls rate of flow of water through filter.	[illegible] flow controller valve.	Open and regulate.	Open and regulate.
CV–46	Recirculation filter line above flow controller valve CV–45	Controls [illegible] for re[illegible] ing.	[illegible] quick acting gate valve.	Open to F. [illegible] regulate.	Open to F. filter.
SCV–47	Recirculation filter line above effluent plug valve CV–46.	Prevent [illegible] coagu[illegible] filter.	[illegible]	[illegible]	[illegible]
DC–48	Base of filter pump	Drains [illegible]	[illegible]	Closed	Closed
DV–49	Drain line from bottom of filter.	Drains [illegible]	[illegible]	Closed	Closed
ARV–50	Top of filter	Releases [illegible] dome filter and filter eleme[illegible]	Air release [illegible]	Closed	Closed
DC–52	Recirculation line from filter to erdlator wet well.	To fac[illegible] drain[illegible] line.	Type A, ¼ in. brass draincock.	Closed	Closed
DC–53	Bottom of flange on the flow controller (CV–45).	Drain w[illegible] tween v[illegible] and fl[illegible]	¼ in. brass draincock.	Closed	Closed

Table 4. Valves and Draincocks—Continued

Symbol	Location	Function	Type and size	Start position	Operating position
DC-24	Top of [illegible] the [illegible] level [illegible]	[illegible] drainage of [illegible]	[illegible] in. brass [illegible]	Closed	Closed
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DC-5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Section III. OPERATION OF EQUIPMENT

15. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for operation of the water purification unit.

b. The operator must know how to perform every operation of which the water purification unit is capable. This section gives instructions on starting and stopping the water purification unit, basic motions of the unit, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

16. [illegible]

a. [illegible] The water [illegible] of pressure-type chlorinator and [illegible] of the water [illegible] pressure water available for operations in the [illegible] filters.

(1) *Erdiator tank.* Raw water is drawn from its source through the aspirators (fig. 3) to the influent launders. The aspirators aerate the water improving the sludge formation. The water overflows from the influent launders into the downcomer tube or mixing zone. Ferric chloride, pulverized limestone, calcium hypochlorite solution, and, when necessary, activated carbon are added to the mixing zone. As the liquid descends through the mixing zone, it is acted by the agitator and sent in a rotating motion toward the bottom of the tube. At the bottom of the tube, shallow baffles direct the flow in a counter rotating motion and into the outer compartment or clarification zone. The rotating motion is reduced in the outer compartment but continues at a sufficient velocity to keep the slurry pool and the clear water above the slurry pool, rotating. The slurry is hydraulically separated from the clear water in the upper section of the erdiator tank or separator zone. The slurry level is controlled by a continuous withdrawal of a small amount of slurry from the top of the slurry pool through the slurry weir box to the sludge concentrator tank. The effluent launder, which is an annular [illegible] to the weir box from [illegible] circle of [illegible] [illegible]

(2) *Wet well tank.* The wet well tank provides limited storage of coagulated water and serves as a sump for the filter pumps. An overflow pipe in the wet well tank permits operation of the erdiator at rated capacity when the filter is stopped. A switch, operated by a float in the wet well, activates a buzzer and warning light when the float valve is open, signaling a low water level. At the same time the float valve, located in the raw water bypass, allows additional raw water to enter the system. The coagulant

water is then pumped from the wet well tank to the filters.

(3) *Sludge concentrator tank.* The sludge concentrator tank (fig. 3) functions as a [illegible] by providing a quiescent zone for settling of [illegible] It also reduces the water rise rate for separation of clear water from the slurry. Flocculent slurry flows by gravity from the erdiator to the concentrator tank where the slurry settles to the bottom of the tank for continuous or intermittent drainage to waste. The clear or coagulated water at the top of the tank is then skimmed back into the wet well tank. The drainage of slurry to waste and the skimming of coagulated water to the wet well tank is controlled manually and depends upon the amount of slurry produced in the erdiator tank.

(4) *Chemical solution feeder.* The chemical solution (fig. 2) feeder pumps ferric chloride and calcium hypochlorite solutions into the downcomer tube or mixing zone (fig. 3). The pump discharge rate is adjustable but delivers a fixed constant rate of feed with each pump stroke at any one setting.

(5) *Chemical slurry feeder.* The chemical slurry feeder (fig. 1) supplies pulverized limestone (coagulant aid) to the [illegible] and chlorinated water as it flows to the filters. Also, the limestone compartment can be used to add activated carbon in event of objectionable taste or odor.

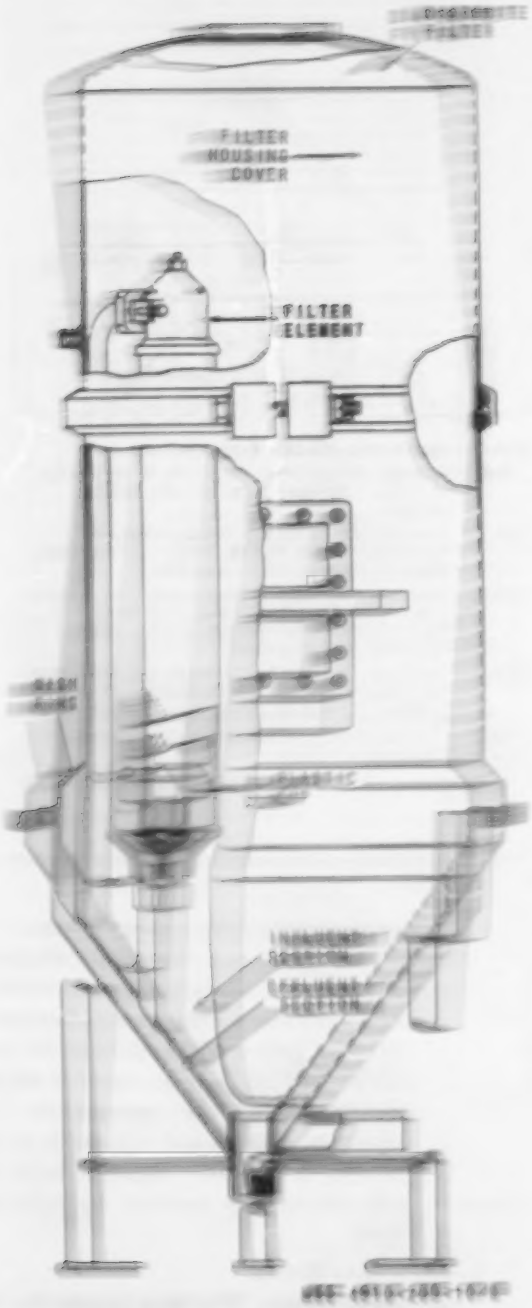
(a) *Limestone compartment.* Raw water is continuously added to the limestone compartment where it is mixed with limestone and kept in constant suspension by the agitators. The limestone slurry then flows by gravity into the downcomer tube or mixing zone. The feeder operates on a dilution principle whereby 95 percent of the initial charge of slurry is fed during a 1-hour period; therefore, it is necessary to recharge the feeder every hour.

(b) *Diatomite slurry compartment.* Filtered water is continuously added to the diatomite compartment where it is mixed with the diatomaceous earth slurry. The diatomaceous earth slurry is fed into the suction side of the filter pumps as in (a) above.

b. Filter Process. The filtering process further reduces suspended matter by use of diatomaceous earth filter aid. The filtering process consists of three steps: precoating, filtering, and backwashing.

(1) *Precoating.* Before the water can be filtered it is necessary to precoat the filter elements (fig. 9). Diatomaceous earth slurry is added to the water line through the precoat funnels (fig. 2). Water is pumped from the wet well through the control valves which are in the FILTER position and up into the filter influent section (fig. 9). The water rises until it begins escaping through the air release valves (fig. 2) which are in WASH position but now must be closed (FILTER position). Air is trapped and compressed in each of the plastic cups (fig. 9) of the elements and in the dome of the filter housing cover. The air is prevented from escaping through the air release valves since it is in the FILTER position. As the water rises it forces its way through the elements leaving diatomaceous earth and suspended matter are deposited on the elements and the water continues on and enters the effluent section. The water then goes through the recirculation valves and back to the wet well. The water is recirculated until it appears clear when viewed through the filter window.

(2) *Filtering.* Filtering removes the remaining suspended matter and organisms from the water. The flow of water is the same as in precoating until it reaches the recirculation valves. These valves are placed in the FILTER position allowing the water to flow into the discharge line instead



of the wet well tank. As the water is pumped from the wet well tank, diatomaceous earth slurry is fed into the water and deposited on the filter elements. This continues for [illegible] of operation every [illegible] depending on the quality of the filter aids and permits longer filter runs but eventually the filters will become plugged and in turn increase the pressure differential across the filter elements. When the effluent pressure gages indicate a pressure of 5 psi, the filters are ready to be backwashed. The time the filter is in operation, from the time the precoat has been added to the time it must be backwashed, is considered a filter run.

(3) *Backwashing.* When the air release valves are in the BACKWASH position, some of the air compressed in the dome of the filter housing cover by-passes the main air valve. This air depresses a diaphragm in the top of the main valve and opens a valve releasing the air in the dome to the atmosphere. This sudden release of air allows the air compressed in the cups in each filter element to expand and force water back through the element filter cakes. This rapid reversal of the water usually dislodges all the [illegible] matter from the elements. If it does not, the elements must be removed and cleaned. [illegible] matter has been removed from the elements with water to the bottom and into the influent section where it can be drained to waste. However, some of the matter will cling to the conical bottom of the influent pipe and must be washed away. When the air release valves are in the WASH position, it allows water to enter the washing (fig. 9) and wash the sediment from the bottom of the filter. After washing, the filters are again ready for precoating.

IV. Chemical Requirements and Preparation

a. General. The following chemicals are required in the treatment and filtration processes:

(1) Ferric chloride—disinfectant
(2) Calcium hypochlorate—coagulant aid
(3) Pulverized limestone—coagulant aid
(4) Diatomaceous earth—filter aid
(5) Activated carbon—to absorb objectionable taste and odors.

These chemicals are mixed proportionately with water in accordance with an established base charge. The base charge is the concentration of mixture or solution expressed as the amount of chemical in a measured quantity of water prepared for the chemical feeder.

Warning: **Protect the eyes and skin from direct contact with chemicals and solution mix. Be especially careful when opening containers to avoid breathing chemical powder. Never mix the two chemicals calcium hypochlorite and ferric chloride. These two chemicals, when mixed, give off a greenish-yellow gas which is irritating, disagreeable, and has a suffocating odor.**

b. Chemical Solution Calibration Charts. Located on the front of the control cabinet (fig. 1), are four chemical solution calibration charts. These charts are provided to aid the operator in determining the proper base charge for each of the chemicals used in the water treatment and filtering process and to calculate the proper settings at which to set the feeder controls. Figure 10 contains a reproduction of the ferric chloride calibration chart and serves as an example to aid the operator in learning to use the calibration charts.

c. Ferric Chloride Solution.

(1) *Base charge.* The base charge as shown on the ferric solution calibration chart (fig. 11) is 1 pound of ferric chloride per gallon of water.

(2) *Preparation and charging.* Empty the contents of five 1-pound bags of ferric chloride into a rubber pail. Fill the pail with 3 gallons of raw water. Stir with a wooden paddle as the water is poured to dissolve the chemical. Refer to figure 12 and charge the ferric chloride solution tank.

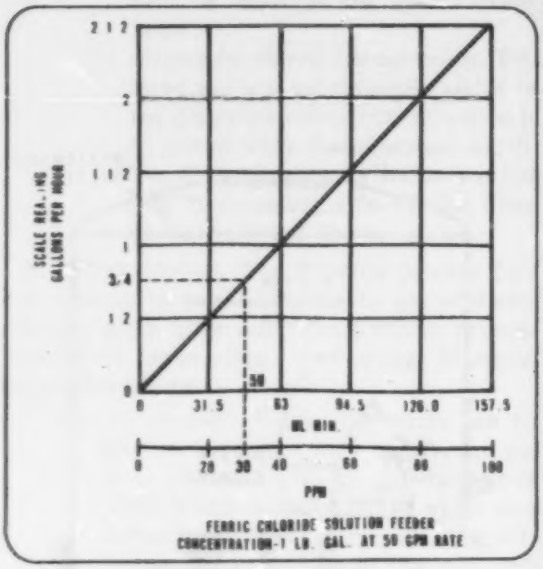
d. Calcium Hypochlorite Solution.

(1) *Base charge.* The base charge as shown in the solution calibration chart (fig. 11) is 4 ounces of calcium hypochlorite to one gallon of water.

(2) *Preparation and charging.* Measure 20 ounces of calcium hypochlorite and pour into a rubber pail. Gradually fill the pail with 3 gallons of raw water and stir as the water is added. Approximately 30 percent of the chemical is inert and will settle to the bottom of the pail. Refer to figure 12 and charge the calcium hypochlorite tank.

e. Limestone Slurry.

(1) *Base charge.* The base charge for the limestone slurry as shown on the cali-



STEP 1. LOCATE REQUIRED DOSAGE ON PPM SCALE
NOTE: REQUIRED DOSAGE (PPM) FOR WATER TO BE TREATED IS USUALLY OBTAINED FROM THE UNIT MEDICAL OFFICER.
STEP 2. USING 30 PPM AS EXAMPLE DOSAGE, PROCEED VERTICALLY TO THE ML/MIN SCALE. THIS READING WOULD BE APPROXIMATELY 50 ML/MIN.
STEP 3. CONTINUE VERTICALLY UNTIL REACHING THE DIAGONAL LINE. FROM THIS POINT, MOVE HORIZONTALLY TO THE LEFT UNTIL THE VERTICAL SCALE (FEEDER SETTINGS) IS ENCOUNTERED.
STEP 4. CALCULATE THE FEEDER SETTING AT THE POINT WHERE THE VERTICAL SCALE IS ENCOUNTERED. IN THIS EXAMPLE IT WOULD BE APPROXIMATELY 3/4 OR 0.75.
STEP 5. THIS SETTING IS THEN USED TO SET THE CHEMICAL EQUIPMENT CONTROLS.

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Figure 10. Example chemical solution calibration chart.

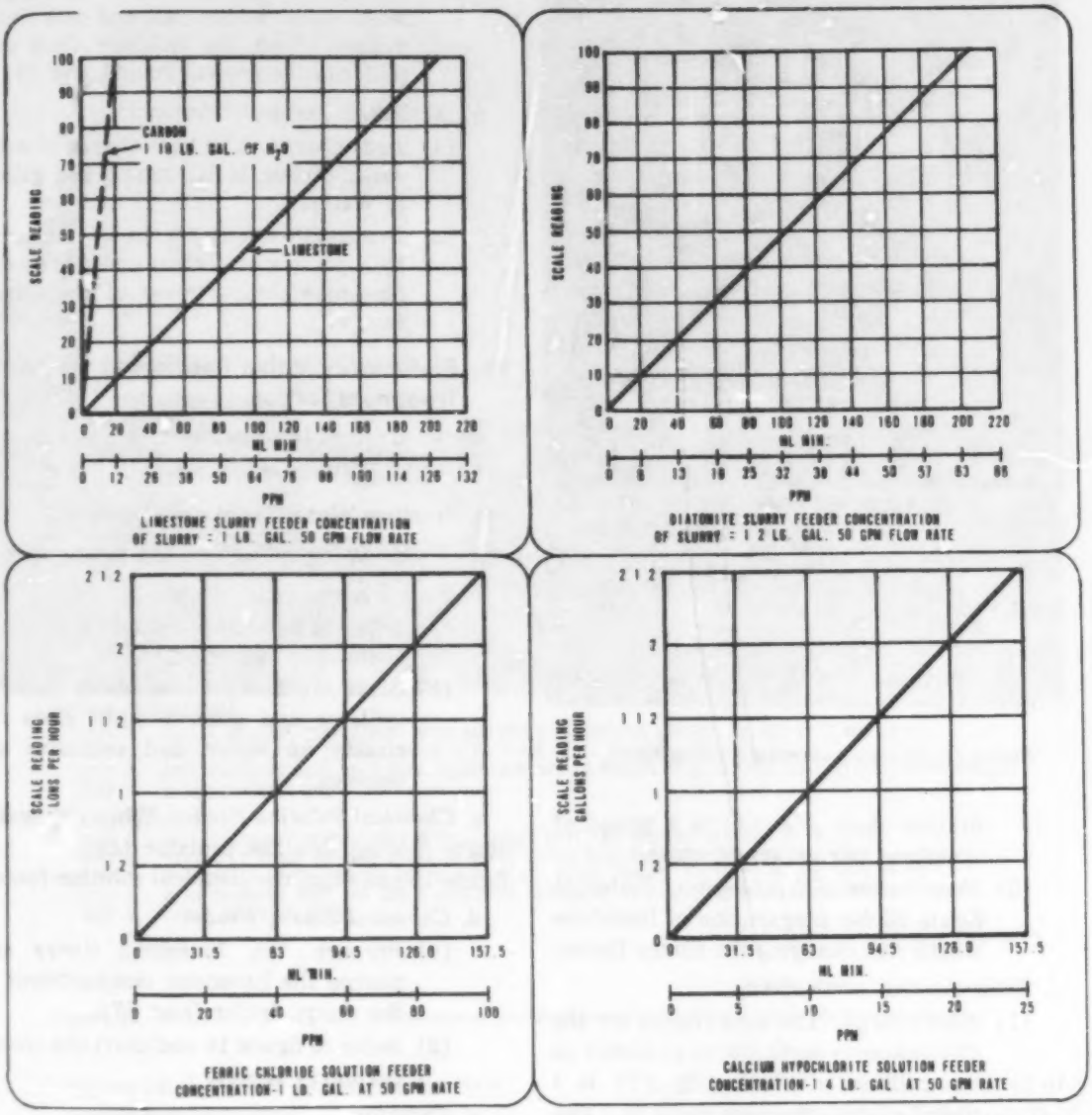


Figure 11. Chemical solution calibration charts.

Figure 12. Charging chemical solution tanks.

bration chart (fig. 11) is 1 pound of limestone per gallon of water.

(2) *Preparation and charging.* Refer to figure 13 for preparation of limestone slurry and charging the slurry feeder.

f. Diatomaceous earth slurry.

(1) *Base charge.* The base charge for the diatomaceous earth slurry as shown on the calibration chart (fig. 11) is 1 pound of diatomaceous earth to 1 gallon of water.

(2) *Preparation and charging.* Refer to figure 13 for preparation of the diatomaceous earth slurry and charging of the slurry feeder.

g. Diatomaceous Earth for Precoating.

(1) *Base charge.* The base charge for precoating is 1½ pounds of diatomaceous earth to 1 gallon of water.

(2) *Preparation.* Measure 1½ pounds of diatomaceous earth and pour into a rubber pail. Add 1 gallon of coagulated water to the pail and mix thoroughly. Pour the mixture from the pail into the precoat funnel (fig. 2).

h. Activated Carbon. (Charcoal)

(1) *Base charge.* The base charge of activated carbon is $\frac{1}{10}$ pound per gallon of water.

(2) *Preparation and charging.* Measure $1\frac{1}{10}$ pounds of carbon and add to the limestone compartment of the slurry feeder.

18. Preliminary Valve Positioning for Water Treatment Section

Refer to figure 14 for water treatment section preliminary valve positioning.

19. Starting Water Treatment Section

a. Power Source. Turn on the power source.

b. Raw Water.

(1) Refer to paragraph 17 and charge the chemical solution tanks.

(2) Start the flow of raw water into the erdlator and observe sight glass for clarity of water and excessive air bubbles.

c. Chemical Solution Feeder. When raw water starts flowing into the erdlator tank, refer to figure 15 and start the chemical solution feeder.

d. Chemical Slurry Feeder.

(1) Prepare the limestone slurry and charge the limestone compartment of the slurry feeder (par. 17).

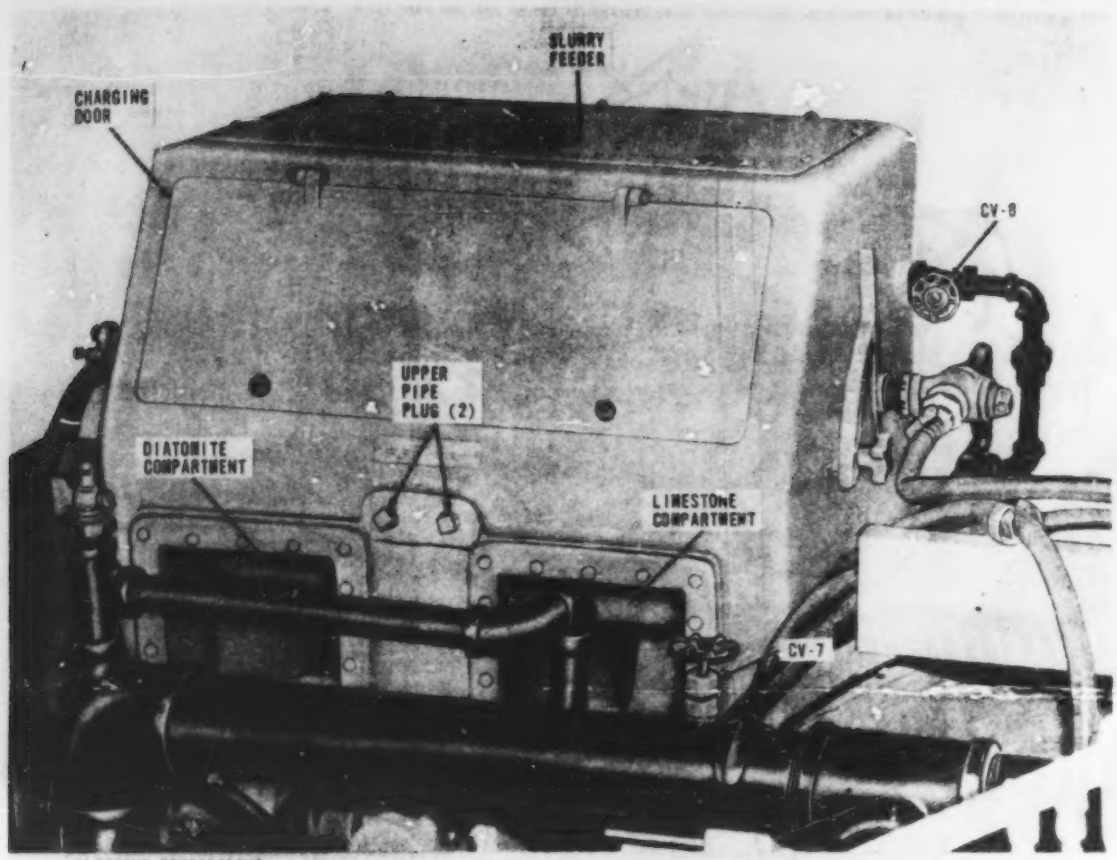
(2) Refer to figure 16 and start the chemical slurry feeder.

e. Erdlator.

(1) *Agitator drive belt.* Refer to figure 17 and adjust the agitator drive belt.

(2) *Starting agitator.* When the erdlator tank has 1 foot of water in the bottom, start the agitator by depressing the start pushbutton (fig. 6).

(3) *Raw water Flow indicator.* Refer to



LIMESTONE COMPARTMENT:
STEP 1. FILL LIMESTONE COMPARTMENT WITH RAW WATER BY OPENING CONTROL VALVES CV-7 AND CV-8.
STEP 2. WHEN WATER LEVEL REACHES UPPER PIPE PLUGS CLOSE CONTROL VALVE CV-8.
STEP 3. OPEN CHARGING DOOR OF SLURRY FEEDER AND ADD 14 POUNDS OF LIMESTONE TO LIMESTONE COMPARTMENT.
STEP 4. CLOSE CHARGING DOOR.

DIATOMITE COMPARTMENT:
STEP 1. FILL DIATOMITE COMPARTMENT WITH FILTERED WATER BY OPENING CONTROL VALVE CV-33.
STEP 2. PARTIALLY CLOSE CONTROL VALVE CV-51 TO ALLOW BACK PRESSURE ON LINE TO FILTER.
STEP 3. WHEN WATER LEVEL REACHES UPPER PIPE PLUG, CLOSE CONTROL VALVE CV-33 AND OPEN CV-51.
STEP 4. OPEN CHARGING DOOR AND ADD 7 POUNDS OF DIATOMITE TO DIATOMITE COMPARTMENT.
STEP 5. CLOSE CHARGING DOOR.

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Figure 18. Limestone slurry and diatomaceous earth slurry preparation and slurry feeder charging.

figure 18 and bleed and adjust the raw water flow indicator.

(4) *Raw water bypass float valve adjustment.* Refer to figure 19 and adjust the raw water bypass float valve.

(5) *Effluent launder.* Refer to figure 20 and level the effluent launder.

(6) *Slurry blanket.* When the erdlator tank is first filled, add 2 pounds of dry limestone and ¼ pound or 2 quarts of prepared ferric chloride to the downcomer tube. This will accelerate the formation of the slurry blanket.

(7) *Sludge concentrator tank.* Open the control valve CV–14 (fig. 4) in the line from the slurry weir box to the con-

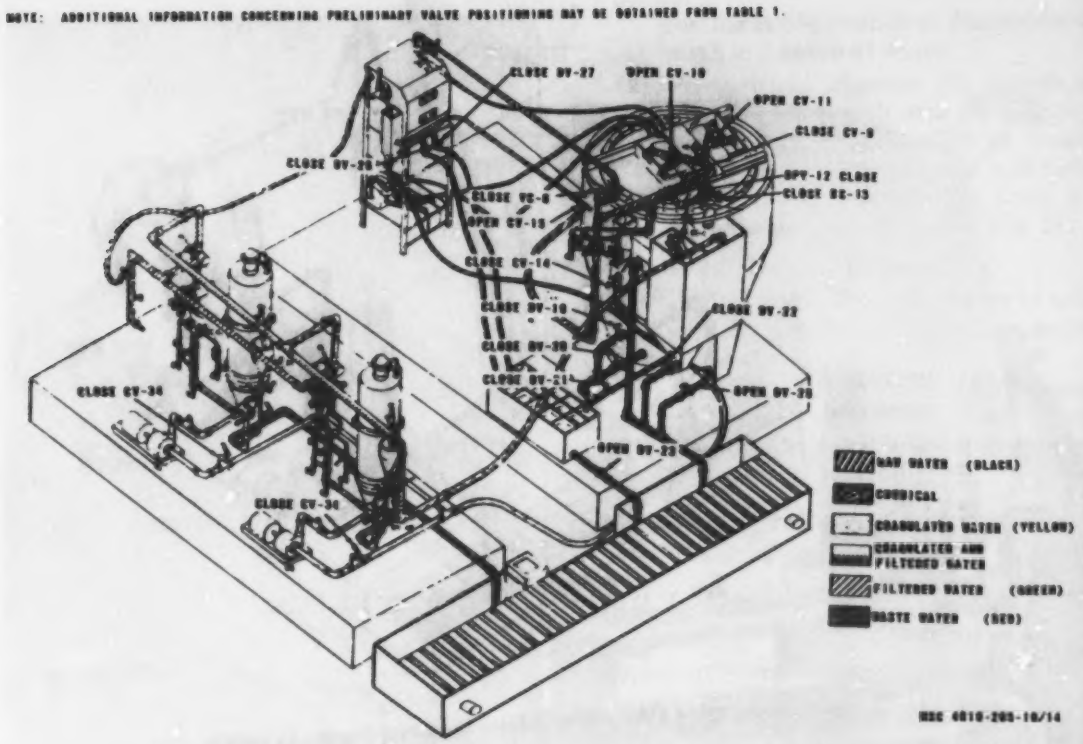


Figure 14. Water treatment section, preliminary valve positioning.

centrator tank. Open the control valve CV–16 in the concentrator tank. When clear water has been established in the upper portion of the sludge concentrator tank, open the control valve CV–17 and allow the clear water to overflow into the wet well tank.

(8) *Adjustments.*

(a) Inspect the clarity characteristics of the water in the top of the erdlator tank and adjust the chemical feed settings as necessary. Inspect the slurry blanket for rotation and adjust the agitator speed as in (1) above, as necessary.

(b) When the coagulated water flowing from the erdlator tank to the wet well tank is clear, close the drain valve DV–25.

Note. The coagulated water in the wet well tank will overflow to waste, through the overflow pipe, until the filter section is in operation.

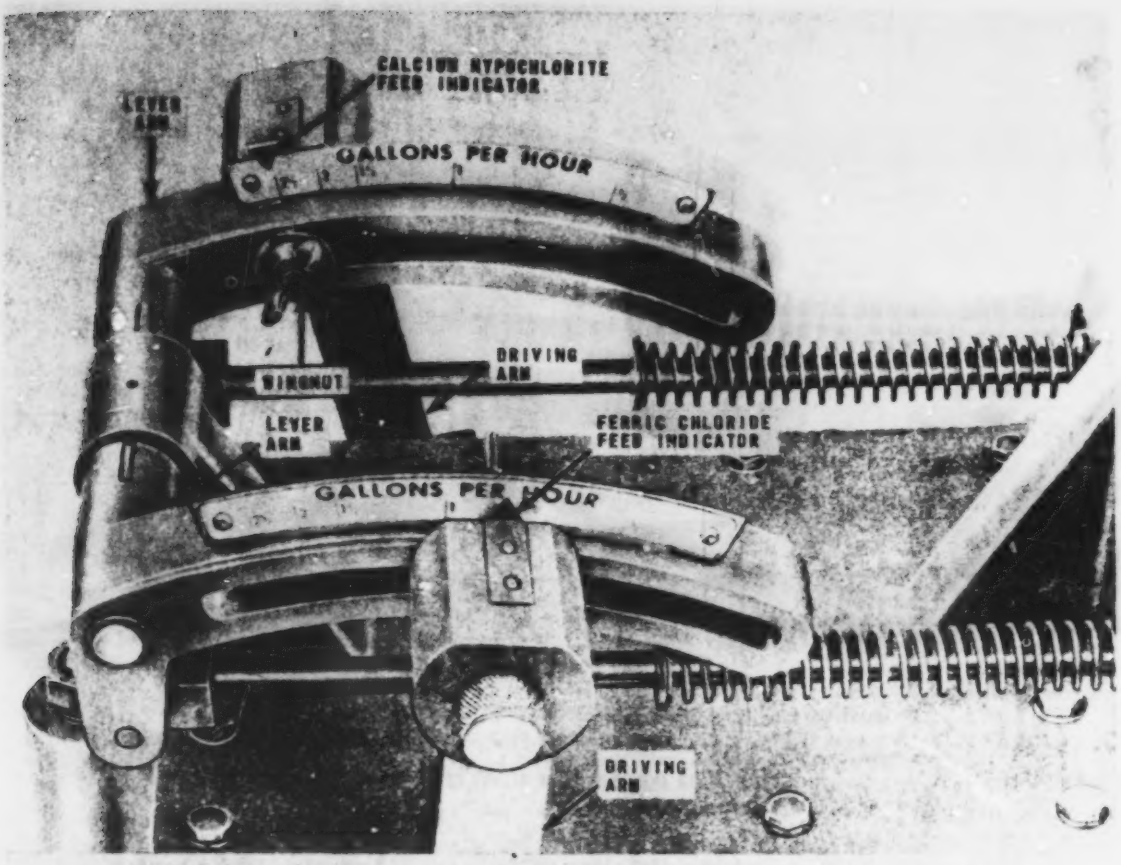
(c) Refer to figure 19 and adjust the float valve for proper closing.

20. Starting Diatomite Filter Section

a. General. It is almost impossible to efficiently fill both filters simultaneously because of the demand on the wet well and piping. Therefore, it is necessary to fill the filters separately as indicated by the following instructions. Refer to paragraph 16 for a description of filter operation.

b. Precoating.

(1) *Filter No. 1.* Refer to figure 21 and perform the preliminary valve positioning and precoat the filter.



STEP 1. PRESS SOLUTION FEEDER START BUTTON (FIG.6).

STEP 2. LOOSEN WINGNUTS AND SET FERRIC CHLORIDE FEED INDICATOR AS DETERMINED BY USE OF SOLUTION CALIBRATION CHART. SET CALCIUM HYPOCHLORITE FEED INDICATOR IN A SIMILAR MANNER. TIGHTEN WINGNUTS.

STEP 3. OBSERVE PLASTIC DISCHARGE HOSES. IF SOLUTION IS NOT FLOWING THROUGH HOSES FEEDER PUMPS HAVE FAILED TO PRIME. HAND PRIME THE PUMPS AS FOLLOWS:

a. PRESS SOLUTION FEEDER STOP BUTTON (FIG.6).

b. REMOVE WINGNUTS AND DISCONNECT DRIVING ARMS FROM LEVER ARMS.

c. OPERATE LEVER ARMS UP AND DOWN RAPIDLY BY HAND UNTIL SOLUTION CAN BE SEEN TO FLOW THROUGH PLASTIC DISCHARGE HOSES.

d. RECONNECT DRIVING ARMS TO LEVER ARMS AND INSTALL WINGNUTS.

e. RESET FEED INDICATORS AS IN STEP 2 ABOVE.

f. PRESS SOLUTION FEEDER START BUTTON (FIG.6).

MSC 4810-205-10/15

Figure 15. Starting chemical solution feeder.

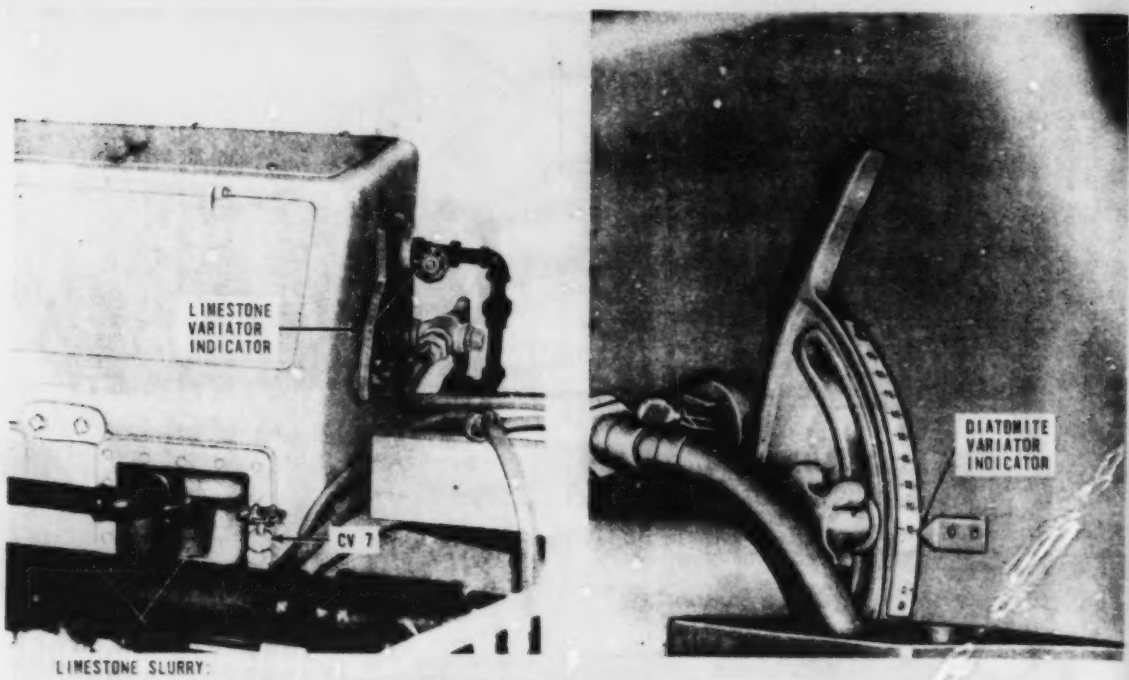

LIMESTONE VARIATOR INDICATOR
CV 7
DIATOMITE VARIATOR INDICATOR
LIMESTONE SLURRY:
STEP 1. SET LIMESTONE VARIATOR INDICATOR AT ZERO
STEP 2. START SLURRY FEEDER DRIVE MOTOR BY PRESSING START BUTTON (FIG. 6).
STEP 3. ALLOW SLURRY TO MIX THOROUGHLY AND THEN SET FEED INDICATOR AS DETERMINED BY USE OF CALIBRATION CHART (FIG. 11).
STEP 4. ADJUST CONTROL VALVE CV-7 TO INSURE FLOW OF SLURRY TO ERDLATOR.
DIATOMITE SLURRY:
STEP 1. SET DIATOMITE VARIATOR INDICATOR AT ZERO
STEP 2. CHARGE DIATOMITE COMPARTMENT (PAR. 17).
STEP 3. WHEN SLURRY IS THOROUGHLY MIXED, SET FEED INDICATOR AS DETERMINED BY USE OF THE CALIBRATION CHART (FIG. 11).
MSC 4610-205-10/16

Figure 16. Starting chemical slurry feeder.

(2) *Filter No. 2.* Refer to figure 21 and precoat filter No. 2 in a manner similar to that for filter No. 1.

c. Filtering. Refer to figure 22 for filter operation.

21. Stopping Diatomite Filter Section

a. General. When a filter run is stopped for any reason, backwash the filter elements and wash the filter bottom.

b. Backwashing. Refer to figure 23 and backwash the filters.

c. Draining. When the filters are shut down, it is necessary that all liquid be drained from the filter section. To drain the filter section, perform the following steps referring to figure 5 for location of all valves.

(1) Open recirculation-filtered water line draincock DV–39.
(2) Open recirculation-filtered water line control valves CV–40 and set controller valves CV–45 at 30 gpm. Open draincocks DC–53 and DC–54 on both controller valves CV–45.
(3) Turn filter effluent control valves CV–46 to RECIRCULATION.
(4) Open draincocks DC–42 DC–44 on the pressure gages.
(5) Turn filter effluent control valve and CV–46 to FILTER and air release valve ARV–50 to BACKWASH.

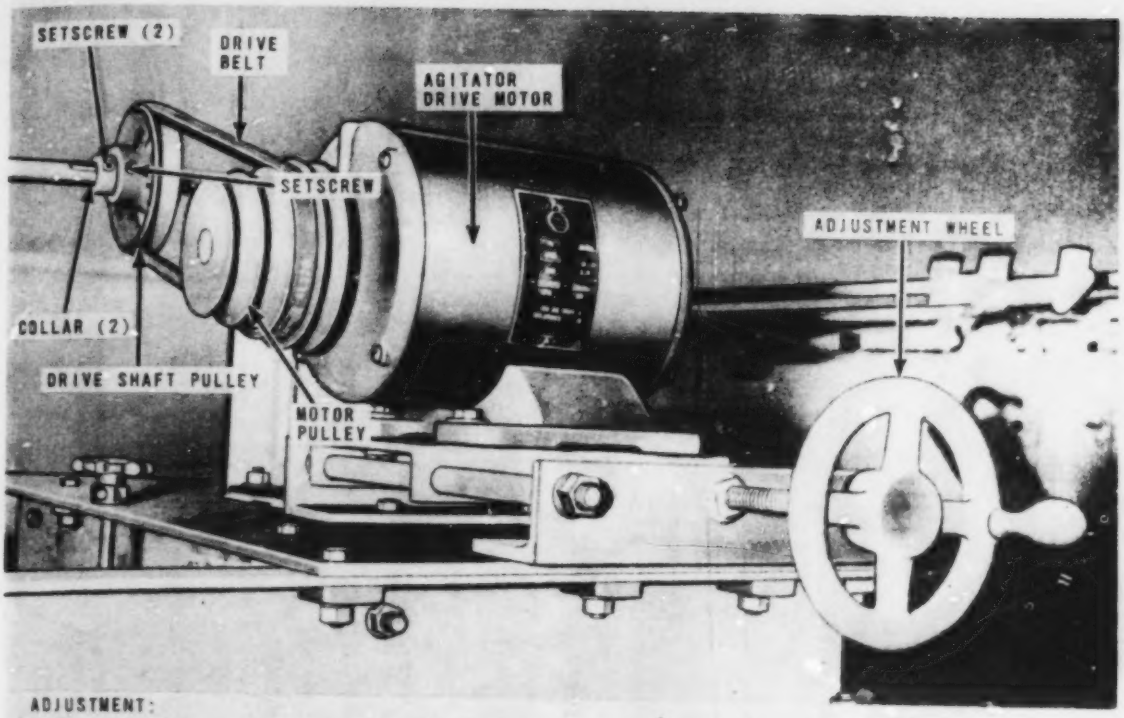

SETSCREW (2)
DRIVE BELT
AGITATOR DRIVE MOTOR
SETSCREW
ADJUSTMENT WHEEL
COLLAR (2)
DRIVE SHAFT PULLEY
MOTOR PULLEY
ADJUSTMENT:
TURN ADJUSTMENT WHEEL CLOCKWISE TO DECREASE BELT TENSION AND COUNTERCLOCKWISE TO INCREASE BELT IS CORRECTLY ADJUSTED WHEN IT CAN BE DEPRESSED ONE INCH MIDWAY BETWEEN PULLEYS
NOTE:
THE SPEED OF THE AGITATOR IS DETERMINED BY WHICH MOTOR PULLEY GROOVE THE DRIVE BELT IS RIDING IN. BY POSITIONING THE BELT IN THE SMALLER DIAMETER GROOVES THE SPEED OF THE AGITATOR IS DECREASED. WHEN BELT IS POSITIONED IN LARGER DIAMETER GROOVES AGITATOR SPEED IS INCREASED. WHEN REPOSITIONING DRIVE BELT LOOSEN THE SETSCREWS IN THE TWO COLLARS AND THE DRIVE PULLEY SETSCREW. MOVE THE DRIVE PULLEY TO THE RIGHT OR LEFT UNTIL DRIVE BELT IS ALINED WITH BOTH PULLEY GROOVES, AND TIGHTEN SETSCREWS.
MSC 4610-205-10/17

Figure 17. Agitator drive belt adjustment.

(6) Open air vent valve CV–38 and precoat funnel valve CV–37.

(7) Open recirculation line draincock DC–52 and filter pump draincocks DC–48.

22. Stopping Water Treatment Section

a. Stopping. Refer to figure 24 and stop the water treatment section.

b. Draining. The water treatment section must be drained when the unit is to be moved to a new worksite, shut down during freezing temperatures, or if the unit is to be inoperative for periods in excess of 48 hours. To drain the water treatment section, perform the following steps referring to figure 5 for location of all valves.

(1) Open the waste tank drain valve DV–23.

(2 Open wet well drain valve D '–25.

(3) Open drawoff control valves CV–16 and CV–17.

(4) Open sludge concentrator drain valves DV–21 and DV–22.

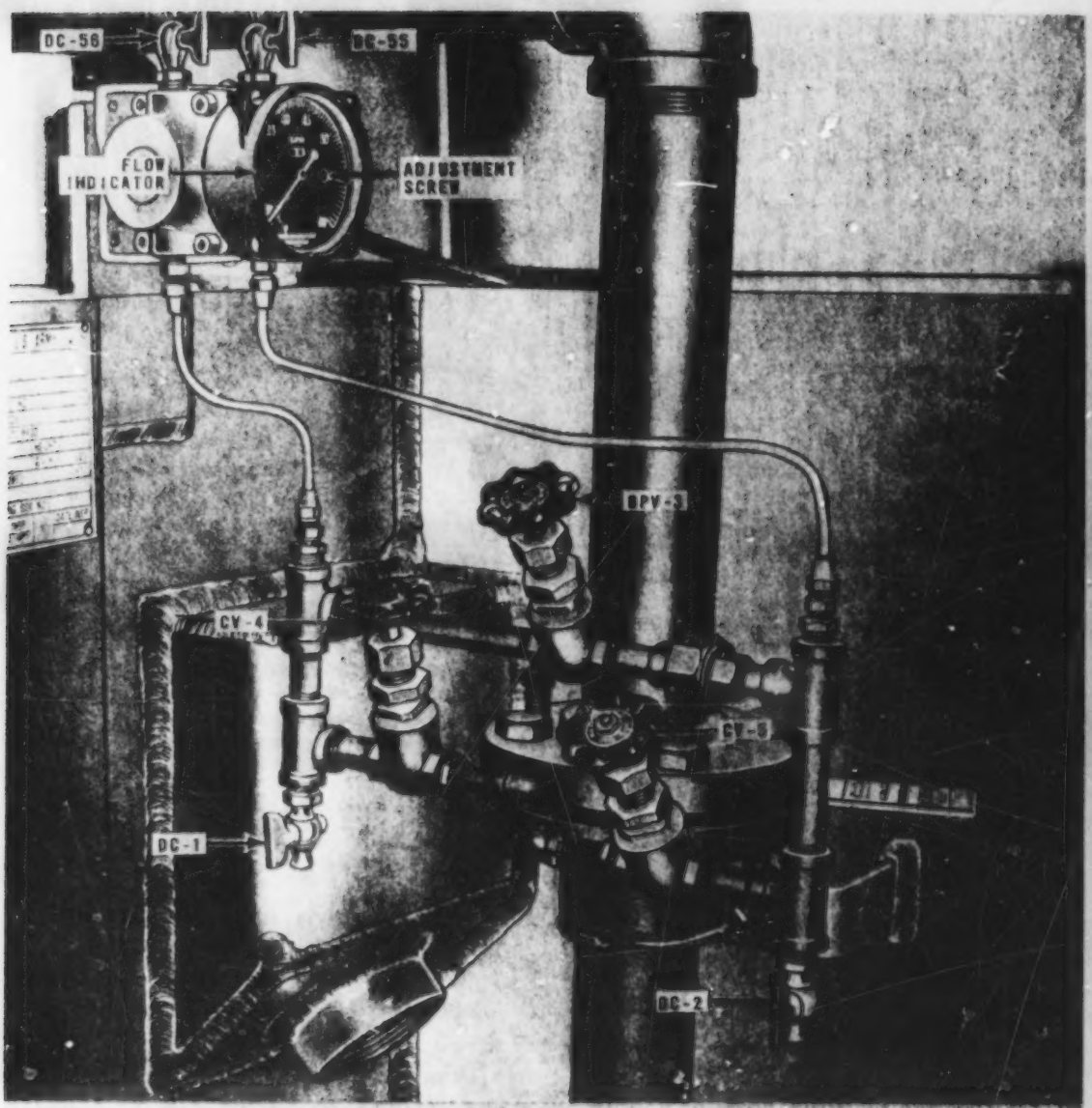
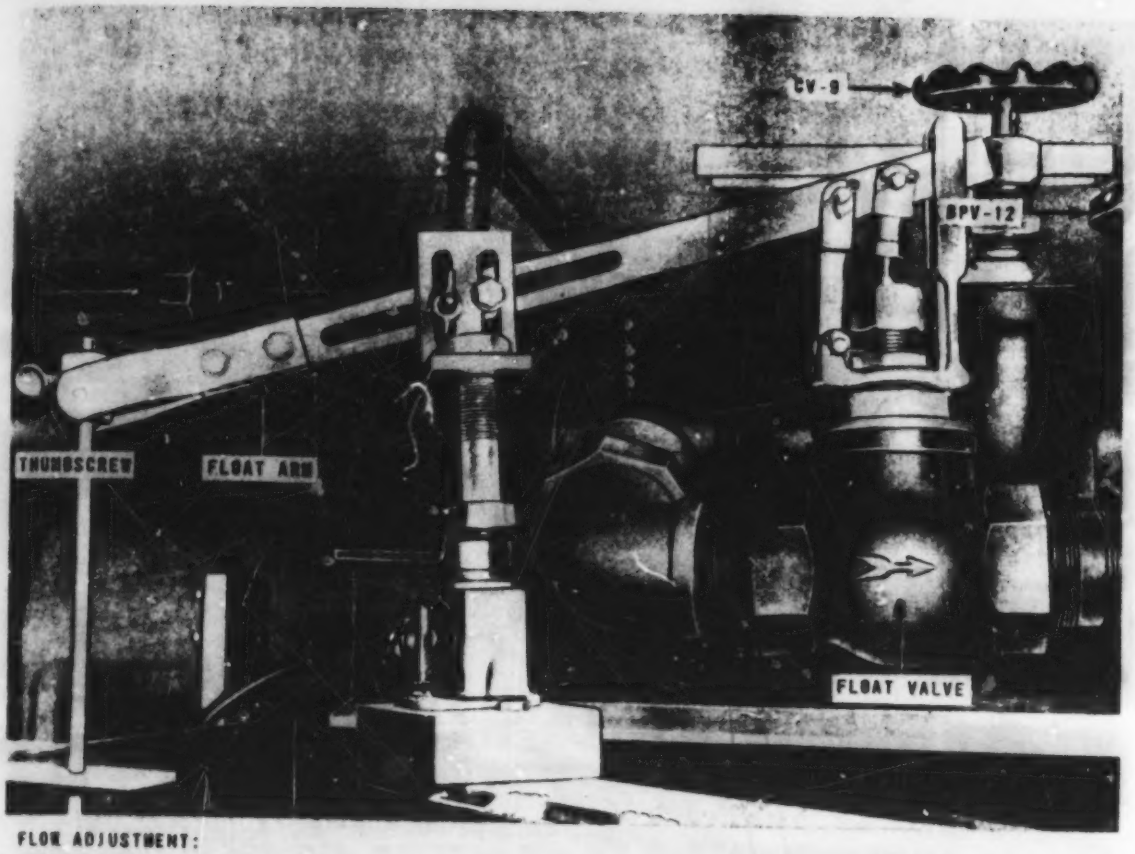

DC-56
DC-55
FLOW INDICATOR
ADJUSTMENT SCREW
BPV-3
CV-4
CV-5
DC-1
DC-2
STEP 1. CLOSE DRAINCOCKS DC-1 AND DC-2.
STEP 2. CLOSE BY-PASS VALVE BPV-3.
STEP 3. OPEN CONTROL VALVES CV-4 AND CV-5.
STEP 4. OPEN DRAINCOCKS DC-55 AND DC56 UNTIL WATER STARTS TO FLOW; THEN CLOSE THE DRAINCOCKS.
STEP 5. OPEN BY-PASS VALVE BPV-3. PRESSURE SHOULD EQUALIZE AND FLOW INDICATOR SHOULD INDICATE ZERO.
STEP 6. IF INDICATOR DOES NOT INDICATE ZERO, TURN THE ADJUSTING SCREW UNTIL THE INDICATOR IS ON ZERO
STEP 7. CLOSE BY-PASS VALVE BPV-3. THE FLOW INDICATOR WILL NOW BE READING THE CORRECT FLOW

Figure 18. Raw water flow indicator, bleeding adjustment.



FLOW ADJUSTMENT:

STEP 1. WITH RAW WATER FLOW INDICATOR ADJUSTED TO ACTUAL FLOW OF RAW WATER, MANUALLY CLOSE RAW WATER FLOAT VALVE.

STEP 2. ADJUST CONTROL VALVE CV-9 UNTIL FLOW INDICATOR READS 50 GPM.

STEP 3. MANUALLY OPEN FLOAT VALVE.

STEP 4. ADJUST BY-PASS VALVE BPV-12 UNTIL INDICATOR READS 80 GPM.

CLOSING ADJUSTMENT:

WHEN WATER IN WET WELL TANK IS 10 INCHES FROM TOP OF TANK, FLOAT VALVE SHOULD BE COMPLETELY CLOSED. IF NOT, LOOSEN THUMBSCREW AND MOVE FLOAT ARM UP OR DOWN UNTIL VALVE IS CLOSED. HOLD ARM IN THAT POSITION AND TIGHTEN THUMBSCREW.

MSC 4610-205-10/19

Figure 19. Raw water bypass float valve, flow and closing adjustment.

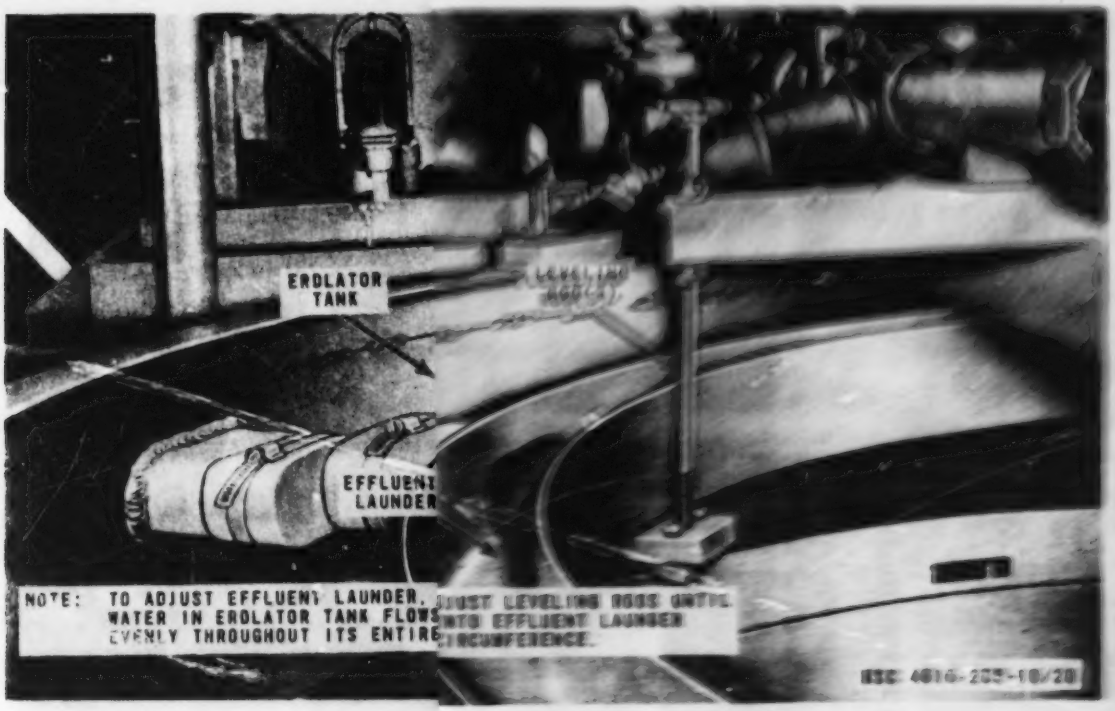

ERDLATOR TANK
EFFLUENT LAUNDER
NOTE: TO ADJUST EFFLUENT LAUNDER, WATER IN ERDLATOR TANK FLOWS EVENLY THROUGHOUT ITS ENTIRE

Figure 9. Effluent launder leveling.

(5) Open erdlator upper and lower drain valves DV–19 and DV–20.

Note. If the erdlator is to be [illegible] for a short period and there is no [illegible] of the water freezing, do not open erdlator lower drain valve DV–20. Water will drain from the upper drain valve DV–19, leaving enough slurry in the bottom of the erdlator tank to form a slurry blanket quickly when operation is resumed.

(6) Open slurry feeder drain valves DV–26 and DV–27.

(7) Open filter section coagulated water influent control valves CV–34.

(8) Open the raw water inffluent valves and draincocks DC–1, DC–2, raw water flow indicator draincock CD–55 and DC–56 bypass valve BPV–3, control valves CV–4, CV–5, CV–7, CV–9, CV–10, CV–11, bypass valve BPV–12, ventcock VC–6, draincock DC–13, and control valve CV–8.

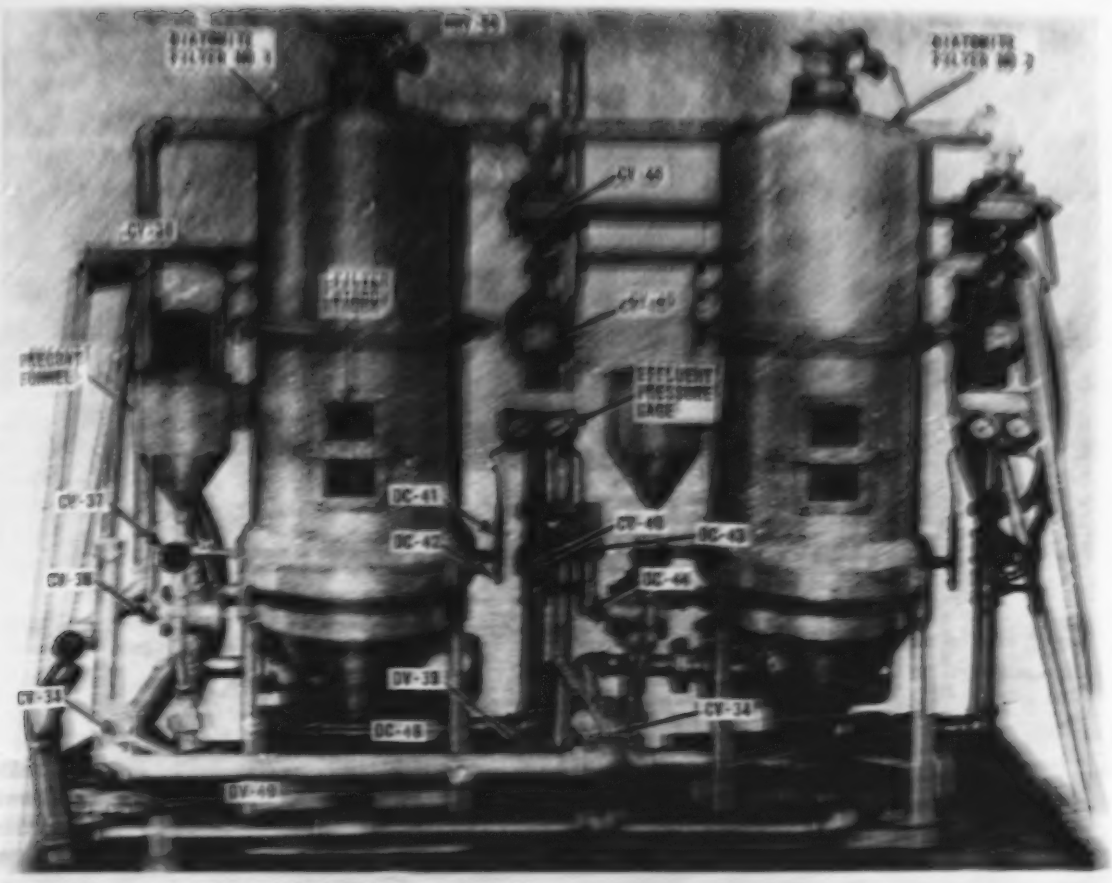
22. Operation of Water Purification Unit

a. General. After the water purification unit is in operation there are certain adjustments that may have to be made. These adjustments will depend upon the quantity and quality of raw water being purified.

b. Adjustment of Chemical Equipment. Adjustment of the chemical equipment will depend upon clarity of the water above the slurry pool in the erdlator tank, filterability of this water, and the length of the filter run.

(1) *Treated water looks cloudy.* If the water above the slurry pool in the erdlator tank looks cloudy, increase the ferric chloride solution discharge rate. Move the feed indicator to a higher setting (fig. 15). Use the calibration chart (fig. 11) in determining the proper setting.

(2) *Treated water has reddish color.* If the water above the slurry blanket has



[illegible]

Figure 81. Filter preliminary valve positioning and presetting.

Figure 22. Filter operation.

a reddish color, decrease the ferric chloride solution discharge rate (fig. 15). Move the feed indicator to a lower setting. Use the calibration chart (fig. 11) as an aid in determining the proper setting.

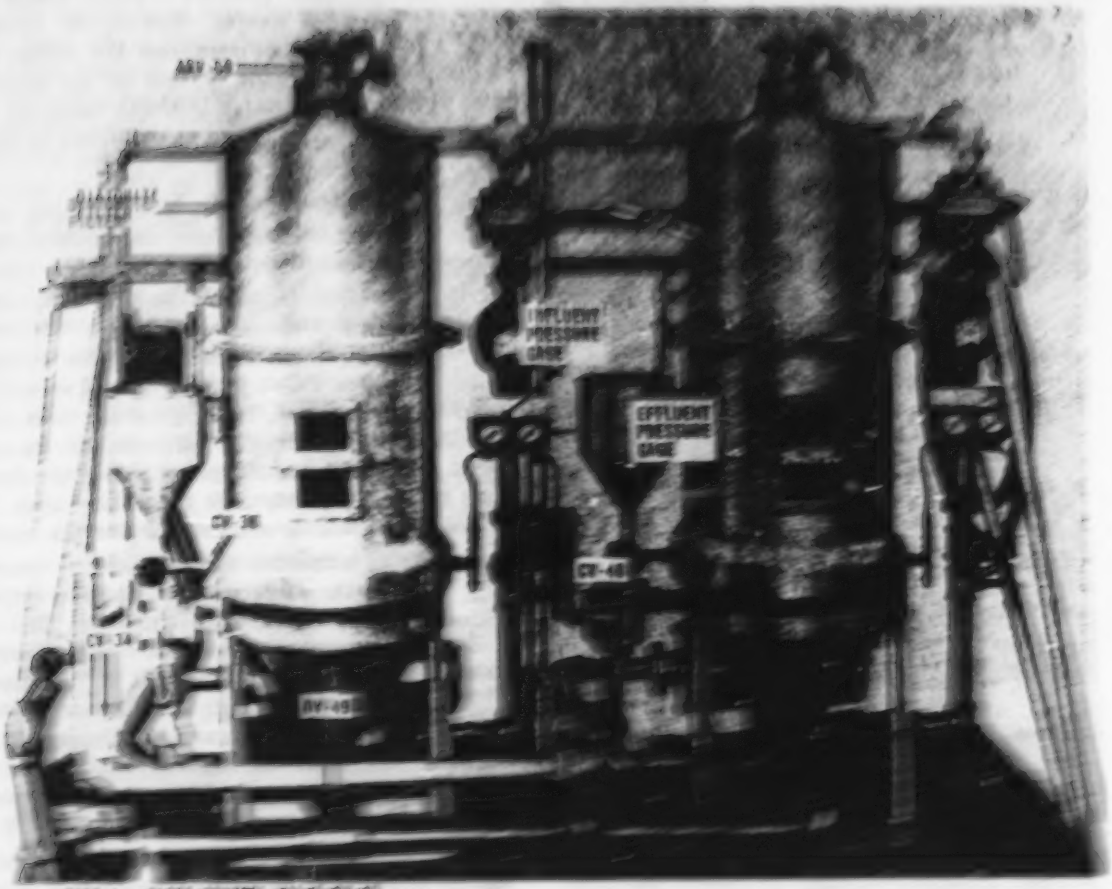
(3) *Treated water clear with large particles and floatables.* If the water above the slurry blanket is clear but large particles are rising and the blanket looks light and fluffy, increase the limestone slurry discharge rate. Move the variator feed indicator to a higher setting (fig. 16). Use the calibration chart (fig. 11) as an aid in determining the proper setting.

(4) *Visible limestone in sample from sludge concentrator tank.* If a sample of slurry from the bottom of the sludge concentrator tank contains visible quantities of limestone, decrease the limestone slurry discharge rate. Move the variator feed indicator to a lower setting (fig. 16). Use the calibration chart (fig. 11) as an aid in determining the proper setting.

(5) *Chlorine residual.* In order to maintain a chlorine residual in the filtered water, it will be necessary to determine the chlorine residual by testing every 30 minutes. Refer to TM 5-700 for testing procedure. If the chlorine residual is lower than that prescribed by the local medical authorities, increase the chlorine proportioning pump discharge rate. Move the feed indicator to a higher setting (fig. 15). If the chlorine residual is greater than that prescribed, move to feed indicator to a lower setting. Use the calibration chart (fig. 11) to aid in determining the proper setting.

(6) *Increase filter run.* To increase the length of the filter run, increase the diatomaceous earth slurry discharge rate. Move the variator feed indicator to a higher setting (fig. 16). Use the calibration chart (fig. 11) as an aid in determining the proper setting.

(7) *Decrease filter run.* To decrease the length of the filter run, decrease the diatomaceous earth slurry discharge



[illegible]

Figure 82. Filter backwashing instructions.

SLURRY FEEDER
SLURRY FEEDER STOP BUTTON
VARIATOR INDICATOR (2)
SOLUTION DISCHARGE HOSE (2)
ERDLATOR AGITATOR STOP BUTTON
SOLUTION FEEDER STOP BUTTON
STEP 1. CLOSE SLURRY FEEDER VARIATOR INDICATORS.
STEP 2. STOP SLURRY FEEDER BY PRESSING STOP BUTTON.
STEP 3. REMOVE SOLUTION FEEDER SUCTION HOSES FROM SOLUTION TANKS. ALLOW FEEDER TO PUMP UNTIL ALL SOLUTION HAS BEEN DRAWN FROM HOSES.
STEP 4. STOP SOLUTION FEEDER BY PRESSING STOP BUTTON.
STEP 5. STOP FLOW OF RAW WATER.
STEP 6. STOP ERDLATOR AGITATOR DRIVE MOTOR BY PRESSING STOP BUTTON.
RSC 4810-295-18/24

Figure 24. Stopping water treatment section.

rate. Move the variator feed indicator to a lower setting (fig. 16). Use the calibration chart (fig. 11) as an aid in determining the proper setting.

(8) *Water has objectionable color, taste, or odor.* Refer to paragraph 17 and add activated carbon (charcoal) to the limestone compartment of the slurry feeder.

c. Recharging Chemical Equipment.

(1) *Chemical slurry feeder.* When the level of the limestone or diatomaceous earth slurry reaches the lower drain plugs, recharge the slurry compartments in a manner similar to that described in par. 17. The required amount of limestone for recharge is 11 pounds. The required amount of diatomaceous earth for recharge is 5½ pounds.

(2) *Chemical solution feeder.* When the level of ferric chloride or calcium hypochlorite solutions are within 4½ inches of the bottom of the solution tanks, recharge the tank requiring additional solution as described in paragraph 17.

d. Preaeration Control. The aspirator aeration manifold, located above the erdlator tank, provides preaeration of the raw water coming into the influent launder. The manifold control valves, CV–10 and CV–11 normally are open.

(1) The normal reading of the pressure gage PG–1 with both valves open is 5 to 7 psi. If the pressure rises above this reading, it indicates that the aspirators are clogged or valves are closed. To remedy this condition, open the valves or remove the foreign matter.

(2) If numerous air bubbles are observed on the surface of the water in the erdlator tank, this indicates that the water is supersaturated with dissolved gases. Partially close or completely close one or both of the control valves. This corrective action will increase the pressure and aeration and release dissolved gases. Adjust the raw water flow as described in paragraph 19.

e. Slurry Blanket Rotation. The slurry blanket in the erdlator must be kept rotating. Banking the slurry blanket on the outer circumference indicates too much rotation while insufficient rotation is indicated by a lack of slurry blanket rotation around and near the outer circumference. The rotation of the slurry blanket is controlled by the speed of the agitator drive belt. Refer to paragraph 19 and adjust the agitator drive belt as necessary.

f. Slurry Level Control and Sludge Removal. After several hours of continuous operation, the amount of slurry in the erdlator tank will increase until the slurry blanket reaches the slurry drawoff port. The slurry will then overflow into the slurry weir box and into the sludge concentrator tank. The slurry blanket will rise in the sludge concentrator tank until it reaches

the top of the inner tank. The concentrator tank control valves CV–16 and CV–17 are kept open during normal operation. Also, the concentrator tank drain valve DV–21 is partially open. As the slurry flows into the concentrator tank, the clear water overflows into the inner tank and into the wet well. A portion of the slurry is drained to waste. The amount of slurry flow from the erdlator tank to the sludge concentrator tank equals the flow of water through the control valve CV–17 into the wet well tank and the flow of sludge through the drain valve DV–21.

Note. If the flow of water drawn into the wet well tank or the amount of sludge drained to waste too great, it will cause turbulance in the sludge concentrator tank and cause slurry carryover to the wet well tank.

(1) Do not permit the slurry blanket in the sludge concentrator tank to rise above or below the rim of the inner tank. Adjust the drain valve DV–21 so that the amount of slurry draining to waste allows an even overflow of clear water into the inner tank.

Note. When treating heavy turbid water, the sludge concentrator tank must be drained rapidly. Increase the opening of drain valve DV–21. To prevent compacting of heavy slurries in the inner tank, close control valve CV–16.

(2) Maintain the slurry blanket in the erdlator tank at a level that will keep the slurry drawoff port just visible in the side of the erdlator tank. To increase or decrease the flow of slurry to the wet well tank, adjust control valve CV–17 or drain valve DV–21.

Note. The control valve CV–14 in the line from the slurry weir box to the sludge concentrator tank should always be open. Do not use this valve to control slurry flow.

g. Wet Well Warning Buzzer and Light. The operation of the warning buzzer and light indicate that the water level in the wet well is low. If low water level persists, decrease filter flow through the controller valves CV–45 to 22 gpm. If low water level still persists, turn the control valve CV–46 to *R* (recirculate) to maintain the coating on the filters until the trouble can be determined.

h. Filter Operation Check. Should any of the following conditions occur, backwash the filter elements (par. 21).

(1) Large area of filter elements are not covered by diatomaceous earth.

(2) The suspended material is visible in the filtered water or the water appears cloudy.

(3) The filter pump effluent pressure gage reads less than 4 psi.

(4) If the filtered water flow drops noticeably indicating that it is no longer practical to continue the filter run, stop the operation and backwash the filters. Refer to paragraph 20 to put the filters back into operation.

24. Operation in Extreme Cold

a. General. The water purification unit will operate satisfactorily in varied temperatures and weather conditions. Operations other than normal will require special operation and maintenance procedures. Refer to TM 5–560 for cold weather construction.

b. Location. Locate the unit to take advantage of natural barriers that will protect the unit from the elements. Provide planking or other solid material to keep the equipment off the ground.

c. Shelter and Protection Against Freezing. Construct windbreaks and erect tenting to protect the equipment. All external water lines must be drained quickly to protect them from freezing. During operation, a 1½-inch line must maintain a flow of approximately 25 gpm to prevent freezing. Filtered water may be recirculated with a distribution pump between filtered water storage facilities to prevent freezing in the lines, outlets, and pump.

Warning: **Do not touch metal parts with bare hands during extremely low temperatures.**

d. Purification Process. Chemical reactions are slower in cold weather. Suspended matter tends to settle more slowly and the water is more difficult to filter. These factors complicate the water treatment process. If clarity of the water can not be obtained, reduce the input rate to 20 gpm. In cold water, 40° F, or less, the erdlator agitator should be set at its lowest mixing speed. When the equipment is to be

shut down, drain all pumps, hoses, pipes, and tanks quickly. Leave all drain valves open and inspect the equipment to see that it is completely drained. To prevent freezing when there is not a continuous demand for water, instead of stopping the unit, maintain the flow of water through the equipment. Put the filters on recirculation and permit the erdlator to operate normally with the effluent waste through the wet well overflow.

e. Lubrication. Lubricate the equipment in accordance with the current lubrication order.

25. Operation During Extreme Heat

a. Location. Locate the unit so as to take advantage of natural shade. Select a site that offers good drainage facilities for waste water.

b. Protection. Erect tenting or other such devises to protect the unit from the direct rays of the sun.

c. Ventilation. Should the unit be located indoors, see that adequate ventilation is provided.

d. Purification Process. Organic matter and plant life grow faster in warm water and sunlight. The increased plant life growth will increase the dissolved gases in shallow raw water supplies. Therefore, every effort should be made to obtain raw water from well below the surface of the supply. Keep the erdlator agitator in continous operation to facilitate the release of dissolved gases. The agitator will have to operate near maximum speed. When the unit is stopped, the slurry should not be kept longer than 24 hours. The increased water temperature stimulates organic fermentation and will make the stored slurry septic, causing floating floc particles.

e. Lubrication. Lubricate the equipment in accordance with the current lubrication order.

26. Operation in Dusty or Sandy Areas

a. Location and Protection. Locate the equipment where dust and sand are at a minimum. Erect barriers and tenting to protect the unit from blowing dust and sand.

b. Cleaning. Whenever possible, wash the unit free of dirt and dust. Wet down the immediate area to lessen the amount of blowing dirt and sand.

c. Purification Process. Unusual raw water may be encountered in sandy or dusty areas. Refer to TM 5–700 for treatment or unusual raw water.

Note. The water purification unit will not remove salt.

d. Lubrication. Keep all lubricant containers tightly sealed to prevent the entry of foreign matter. Lubrication points should be kept as clean as possible to prevent the accumulation of dust and sand. Lubricate the unit in accordance with the current lubrication order.

27. Operation in Rainy or Humid Areas

a. Location. Locate the unit on a site that offers adequate drainage. Position the unit on planking or other solid surface to prevent sinking or settling.

b. Protection. Locate the unit indoors or erect tenting to protect the electrical equipment from water damage. During dry periods, open the control cabinet and allow it to dry out.

c. Chemical Supplies. Store the chemical supplies in an area that is as dry as possible.

28. Operation in Salt Water Areas

Salt water causes corrosive action on metal. Care must be taken to avoid contact of equipment with salt water. If contact is made, or if the unit is exposed to salt spray, wash the equipment with fresh water.

Note. The equipment covered by this manual will not remove salt.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S TOOLS AND EQUIPMENT

29. Special Tools and Equipment

No special tools or equipment are required by the operator for the maintenance of this water purification unit.

30. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the water purification unit are listed in the basic issue items list (App. II).

Section II. LUBRICATION

31. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and not specifically covered in, the lubrication order.

b. The lubrication order shown in figure 25 is an exact reproduction of the approved lubrication order for the water purification unit. For the current lubrication order, refer to DA Pam 310–4.

LUBRICATION ORDER

LO5-4610-205-20

WATER PURIFICATION UNIT: BASE MOUNTED;ELECTRIC DRIVEN, AC, 115, 208 VOLT, SINGLE PHASE AND 3 PHASE, 60 CYCLE; 3000 GALLON PER HOUR (MET-PRO MODEL 3000-2700A)

Reference: C9100-SL

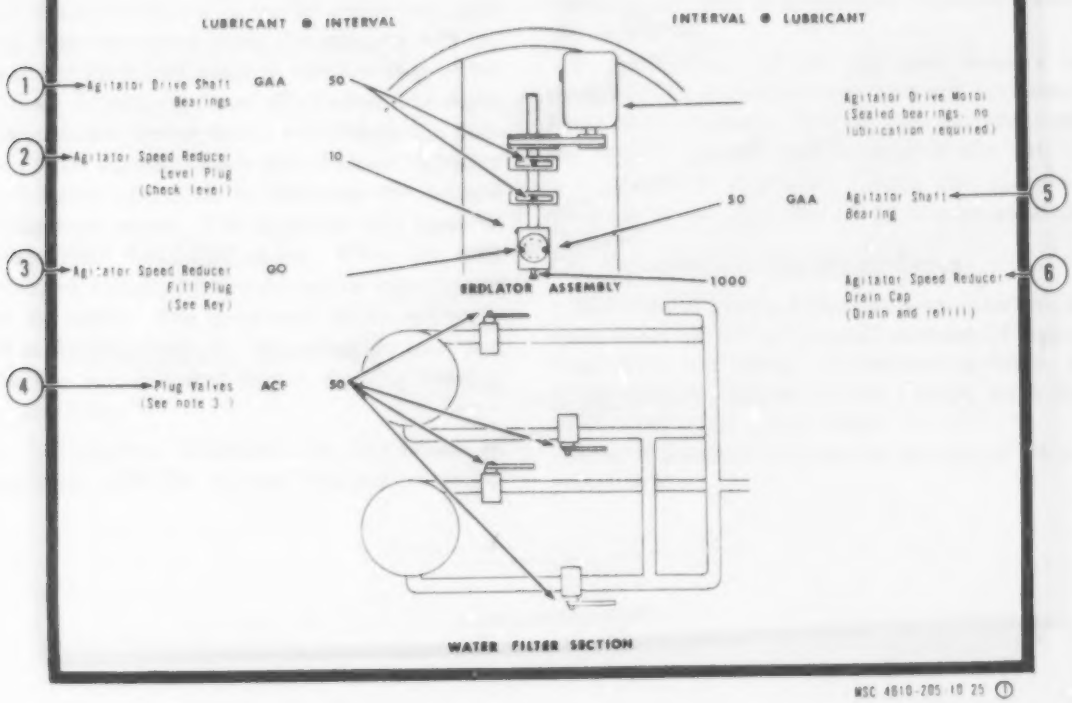
Intervals are based on normal operation. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Drain gear cases when hot. Fill and check level.


LUBRICANT ● INTERVAL
INTERVAL ● LUBRICANT
1 Agitator Drive Shaft Bearings GAA 50
2 Agitator Speed Reducer Level Plug (Check level) 10
3 Agitator Speed Reducer Fill Plug (See Key) GO
4 Plug Valves (See note 3.) ACF 50
Agitator Drive Motor (Sealed bearings, no lubrication required)
50 GAA Agitator Shaft Bearing 5
1000 Agitator Speed Reducer Drain Cap (Drain and refill) 6
ERDLATOR ASSEMBLY
WATER FILTER SECTION

MSC 4810-205-10 25 ①

1 Front

Figure 25. Lubrication order.

LUBRICANT @ INTERVAL

INTERVAL @ LUBRICANT

(7) Slurry Feeder Speed Reducer Fill Plug (See key) — GO

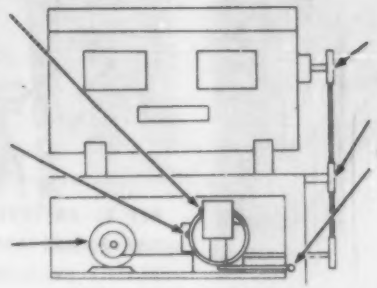
(8) Slurry Feeder Speed Reducer Level Plug (Check level) — 10

Slurry Feeder Drive Motor (Sealed bearings) no lubrication required

50 GAA — Slip Clutch and Slurry Feeder Bearings (10)

50 GAA — Slurry Feeder Chain Tightener (11)

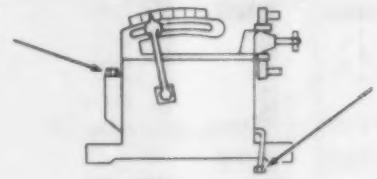
1000 — Slurry Feeder Speed Reducer Drain Plug (Drain and refill) (12)



CHEMICAL SLURRY FEED EQUIPMENT

(9) Gear Case Fill and Level Gage -(Check level) (See key) — OT 10

500 — Gear Case Drain cap (Drain and refill) (13)



SOLUTION FEEDER ASSEMBLY

-KEY-

	LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			Above 32°F	40°F to 10°F	0°F to -65°F	
OT-	INSULATING OIL, Electrical		OT	OT	OT	Intervals given are in hours of normal operation
	Solution Feeder Gear Case	5 qt				
OE-	OIL, Engine, Heavy Duty		OE 30	OE 10	OES	
	Oil Can Points					
OES-	Oil, Engine, Sub-zero					
GO-	LUBRICATING OIL, Gear		GO 140	GO 90	GOS	
	Agitator Speed Reducer	7 16 qt				
	Slurry Feeder Speed Reducer	9 16 qt				
GOS-	LUBRICATING OIL, Gear, Subzero					
ACF	GREASE, Plug Valve	(See note 3)	ALL TEMPERATURES			
GAA-	GREASE, Automotive and Artillery					

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. OIL CAN POINTS. Every 50 hours clean and lightly coat all exposed adjusting threads with OE.

3. GREASE, PLUG VALVE. American Car and Foundry Company, ACF Lubricant No. 24 or equal.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

EARLE G. WHEELER
General, United States Army
Chief of Staff

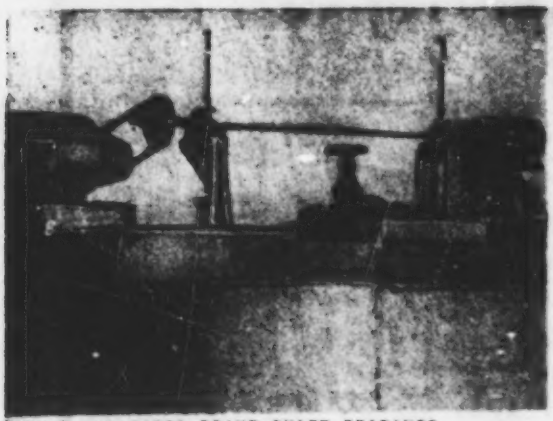
OFFICIAL:

J. C. LAMBERT
Major General, United States Army
The Adjutant General

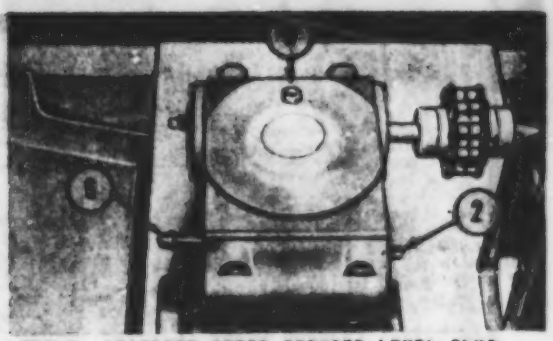
NSC 4810-205-10-25 (2)

2 Back

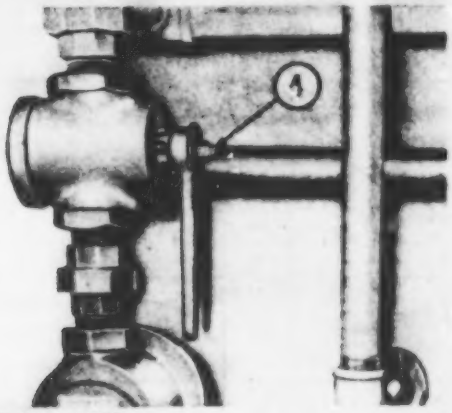
Figure 25—Continued.



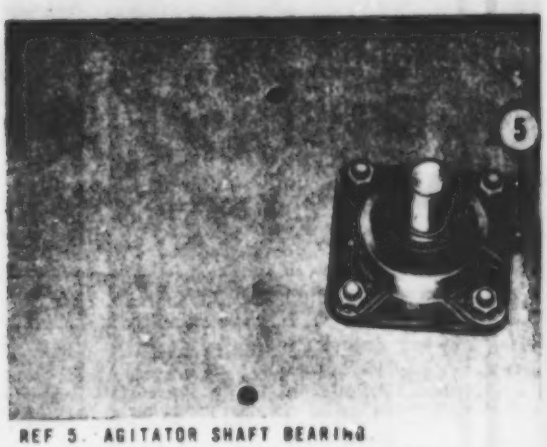
REF 1. AGITATOR DRIVE SHAFT BEARINGS.



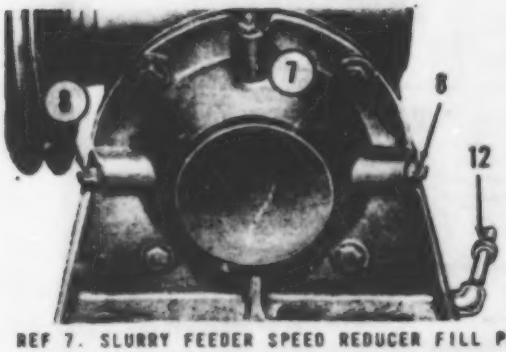
REF 2. AGITATOR SPEED REDUCER LEVEL PLUG.
REF 3. AGITATOR SPEED REDUCER FILL PLUG.
REF 6. AGITATOR SPEED REDUCER DRAIN CAP.



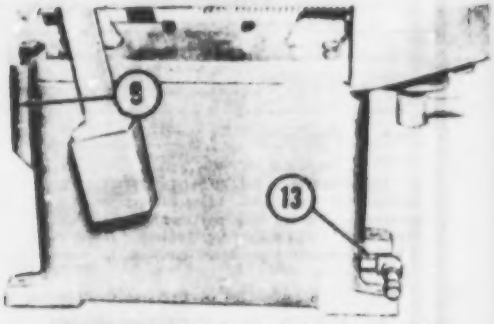
REF 4. PLUG VALVES



REF 5. AGITATOR SHAFT BEARING



REF 7. SLURRY FEEDER SPEED REDUCER FILL PLUG.
REF 8. SLURRY FEEDER SPEED REDUCER LEVEL PLUG.
REF 12. SLURRY FEEDER SPEED REDUCER DRAIN CAP.



REF 9. SOLUTION FEEDER GEAR CASE FILL AND LEVEL GAGE.
REF 13. SOLUTION FEEDER GEAR CASE DRAIN CAP.

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3 Reference 1 through 9, 12 and 13

Figure 25—Continued.

32. Detailed Lubrication Information

a. Care of Lubricants. Keep all lubricants in sealed containers and stored in a cool, dry, clean place. Keep lubricants free of dust, dirt, water, and foreign matter.

b. Point of Lubrication. Refer to figure 25 for illustration of the lubrication points.

c. Cleaning. Wipe all lubrication points free of dirt and grease before lubricating. Clean all lubrication points after lubricating to prevent the accumulation of foreign matter.

d. Operation Immediately After Lubrication. If practical, operate the equipment immediately after lubrication. Inspect all gear boxes to make sure there is no leakage.

References 10 and 11

Figure 25—Continued.

Section III. PREVENTIVE MAINTENANCE SERVICES

33. General

To insure that the purification unit is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance Services to be performed are listed and described in paragraph 34. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for further correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

34. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 26 for the daily preventive maintenance services.

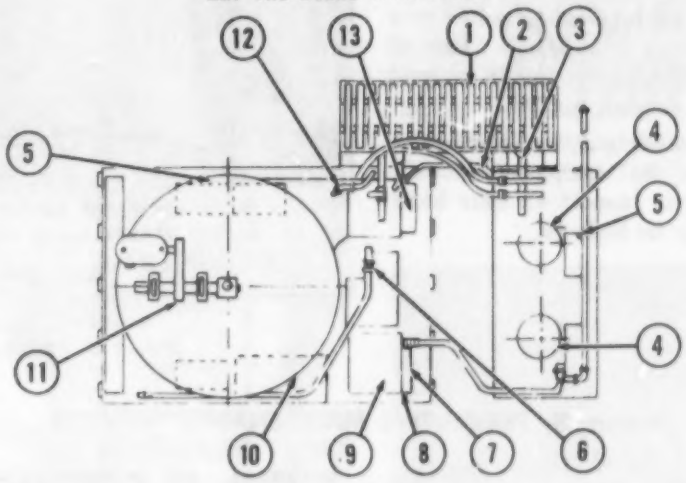
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM5-4610-205-10

MET-PRO MODEL 3000-2700A

WATER PURIFICATION UNIT



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	DRAIN TANK ASSEMBLY. Check for damage and leaks. Clean the strainer, tank, and vent as necessary. Check the level control switch for damage.	
2	POWER CABLE ASSEMBLIES. Check the power cables for cracked, broken or worn insulation.	
3	HOSES, PIPES, AND VALVES. Check for leaks and damage.	
4	FILTER ASSEMBLIES. Service as necessary.	60
5	GROUND LUG AND WIRE CLAMP. Tighten loose ground lug-and-wire clamp.	
6	SIGHT GLASS. Check for damage. Clean a dirty sight glass.	
7	DRIVE CHAIN. Check the chain and sprocket for excessive wear.	
8	SLURRY FEEDER DRIVE BELT. Check for frayed or cracked belt. Proper belt adjustment is a deflection of 1/2 to 1 inch midway between pulleys. (Weekly)	59
9	CHEMICAL FEEDER EQUIPMENT. Check for damage and leaks.	
10	ERDLATOR. Check for damage. Tighten loose mounting.	

Figure 26. Daily preventive maintenance services.

ITEM		PAR REF
11	AGITATOR DRIVE BELT. Proper belt adjustment is a deflection of 1 inch midway between pulleys. Align pulleys as necessary.	19
12	LOW WATER ALARM FLOAT, VALVE, AND SWITCH. Align and adjust as necessary.	19
13	LOW WATER ALARM LIGHT. Check for damage. Replace an unserviceable lamp.	57
	NOTE 1. OPERATION. During operation observe for unusual noise, vibration, and leaks.	
	NOTE 2. CONTROLS AND INSTRUMENTS. Check for damage. With the unit operating, check for proper operation. Normal operating readings for instruments are as follows: Aspirator manifold pressure gage — 10-15 psig Influent filter pump pressure gage — 0-65 psig Effluent filter pump pressure gage — 0-65 psig Raw water flow indicator — 50 gpm Voltmeter — 208 volts Ammeter — Indicates load current	

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Figure 22—Continued.

Section IV. TROUBLESHOOTING

35. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the water purification unit and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any operational trouble beyond the scope of the operator will be reported to organizational maintenance.

36. Raw Water Sight Glass Fails To Show Water

Probable cause	Possible remedy
Restricted sight glass inlet port	Service sight glass (par. 58).
Air lock in sight glass	Loosen sight glass during operation and bleed air.

37. Raw Water Flow Indicator Inoperative

Probable cause	Possible remedy
Air lock in indicator line	Bleed indicator (par. 19).

38. Erdlator Fails To Deliver Desired Quantity of Water

Probable cause	Possible remedy
Valves improperly positioned	Reposition valves (par. 18).
Raw water input inadequate	Increase raw water input.
Agitator drive belt improperly adjusted	Adjust drive belt (par. 19).
Excessive floc around slurry drawoff port in erdlator tank	Adjust control valves (par. 19).

39. Erdlator Fails To Deliver Desired Quality of Water

Probable cause	Possible remedy
Chemical slurry feeder not supplying sufficient slurry to erdlator tank.	Refer to paragraph 41.
Chemical solution feeder not supplying sufficient solution to erdlator tank.	Refer to paragraph 42.
Slurry pool too high in erdlator	Decrease raw water input.
Slurry pool banking in erdlator	Decrease agitator speed (par. 19).

40. Large Floc Particles and Foam Floating on Water Above Slurry Pool in Erdlator

Probable cause	Possible remedy
Limestone slurry feeder improperly adjusted	Adjust setting of slurry feeder (par. 41).
Agitator speed too slow	Adjust drive belt to increase speed (par. 19).
Aspirator valves improperly positioned	Reposition aspirator valves (par. 18).

41. Chemical Slurry Feeder Fails To Supply Sufficient Slurry to Erdlator

Probable cause	Possible remedy
Control valves partially closed	Open valves.
Insufficient water available to slurry feeder	Open all valves in feeder influent lines. Check variators for proper setting.
Fuse defective	Replace fuse (par. 56).
Chemical not thoroughly mixed	Adjust drive belt to prevent slippage (par. 59).
Ejectors clogged	Remove plugs and open ejectors using a piece of wire.
Slurry feeder effluent lines clogged	Remove restrictions.
Base charge improperly prepared	Recharge feeder (par. 17).

42. Chemical Solution Feeder Fails To Supply Solution to Erdlator

Probable cause	Possible remedy
Fuse defective	Replace fuse (par. 56).
Feeder pump failed to prime	Hand prime feeder pump (par. 19).
Solution feeder effluent lines clogged	Remove restrictions.
Controls improperly set	Reset controls (par. 19).
Base charge incorrectly prepared	Recharge feeder (par. 17).

43. Sludge Concentrator Tank Slurry Blanket Rises Too High

Probable cause	*Possible remedy*
Valves improperly positioned	Reposition valves (par. 18).
Filter pumps fail to deliver water	Refer to paragraph 47.

44. Wet Well Fails To Deliver Sufficient Clear Water

Probable cause	*Possible remedy*
Valves not positioned correctly	Refer to paragraph 23 and reposition valves CV-16, CV-17, and DV-21 as necessary.
Filter pump fails to deliver water	Refer to paragraph 47.

45. Wet Well Warning Buzzer or Light Fails To Operate When Water Is Low in Wet Well

Probable cause	*Possible remedy*
Float valve improperly adjusted	Adjust float valve (par. 19).
Warning light lamp defective	Replace lamp (par. 57).

46. Filter Elements Will Not Take Precoat

Probable cause	*Possible remedy*
Valve incorrectly positioned	Reposition valve (par. 18).
Elements clogged	Backwash or service elements as necessary (pars. 21 and 60).
Filter elements incorrectly installed	Reinstall elements (par. 60).
Filter pump fails to deliver water	Refer to paragraph 47.

47. Filter Pumps Fail To Deliver Water

Probable cause	*Possible remedy*
Valves incorrectly positioned	Reposition valves (par. 18).

48. Diatomite Filter Will Not Deliver Water

Probable cause	*Possible remedy*
Filter elements clogged	Backwash or service elements as necessary (pars. 21 and 60).
Valves incorrectly positioned	Reposition valves (par. 18).
Filter pump will not deliver water	Refer to paragraph 47.

49. Diatomite Filter Runs Too Long or Too Short

Probable cause	*Possible remedy*
Filter elements clogged	Backwash or service elements as necessary (pars. 21 and 60).
Incorrect diatomite dosage	Reset feeder controls (par. 19).
Improper backwash	Backwash and precoat (pars. 20 and 21).
Improper precoat	Backwash and precoat (pars. 20 and 21).

50. Filter Effluent Gage Reading Drops Faster Than Usual

Probable cause	*Possible remedy*
Filter elements clogged	Backwash or service elements as necessary (pars. 21 and 60).
Influent water of poor quality	Refer to paragraph 39.
Loose line connection	Tighten connection.

51. Water Not Clear After Filtering

Probable cause	*Possible remedy*
Filter cake broken	Backwash and precoat filters (pars. 20 and 21).
Filter element defective	Replace filter elements (par. 60).

Section V. FIELD EXPEDIENT REPAIRS

52. General

Operational troubles may occur while the generator set is operating in the field where supplies and repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient remedies may be used during emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible, and properly repaired before being placed in operation again.

53. Loss of Water

Trouble	Expedient remedy
Water hose cracked	Tape the hose in the area of the crack with any tape available. Operate the unit until a replacement hose can be obtained.

54. Loss of Electrical Power

Trouble	Expedient remedy
Broken electrical cable	Splice the cable and tape the connection. Operate the unit until a replacement cable can be obtained.

55. Filtered Water Contains Diatomite

Trouble	Expedient remedy
Filter element defective	Remove the filter assembly and cap off upper pipe flange. Remove adapter bushing from base of filter housing and install pipe cap. Do not operate filter with more than two filter assemblies removed (par. 60).

Section VI. OPERATOR'S MAINTENANCE

56. Chemical Equipment Fuse

a. Removal. Refer to figure 27 and remove the chemical equipment fuse.

b. Cleaning and Inspection. Wipe the fuse free of dirt and grease using a dry cloth. Inspect the fuse for cracks, discoloration, and other evidence of being defective. Replace a defective fuse.

c. Installation. Refer to figure 27 and install the chemical equipment fuse.

57. Wet Well Warning Light

a. Removal. Refer to figure 28 and remove the wet well warning light lamp.

b. Cleaning and Inspection. Wipe the lamp clean with a clean, dry cloth. Inspect the lamp for cracks, breaks, and burned out filament. Replace a defective lamp.

c. Installation. Refer to figure 28 and install the wet well warning light lamp.

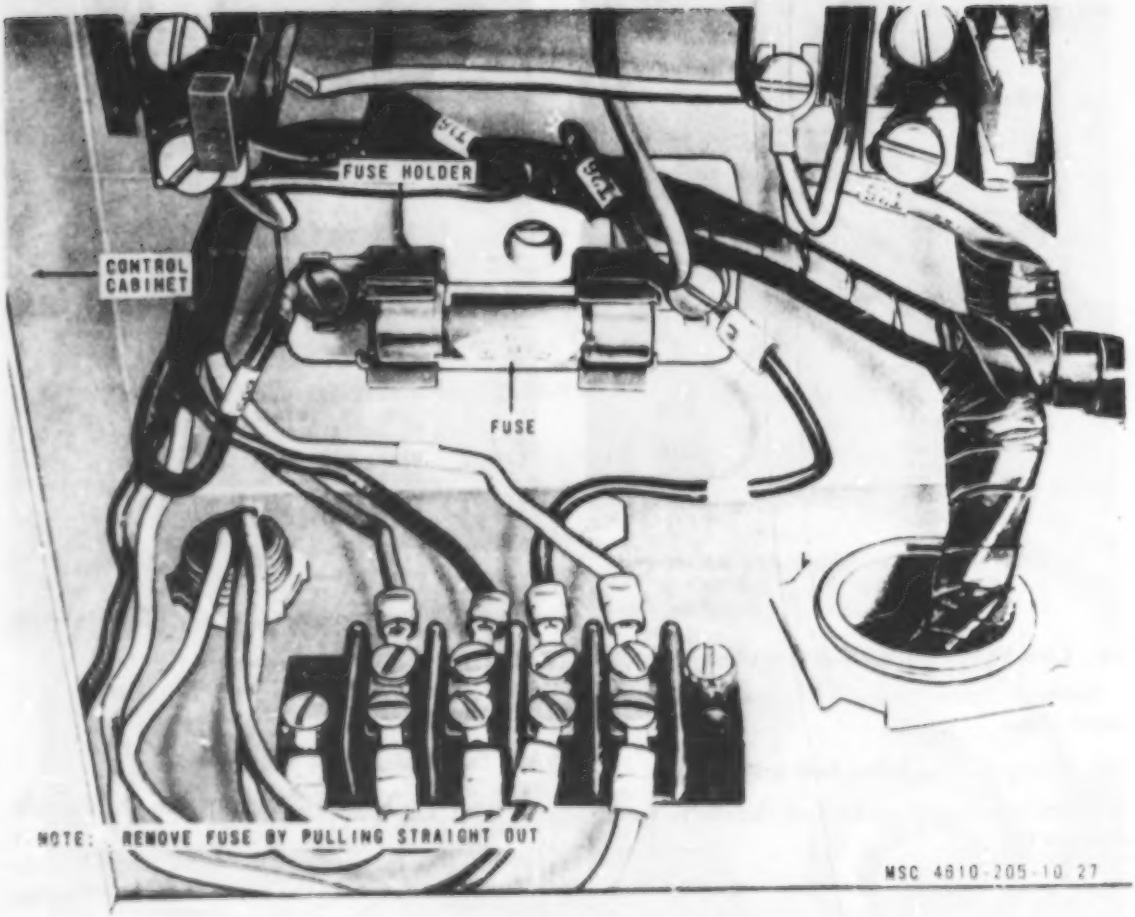


Figure 27. Chemical equipment fuse, removal and installation.

Figure 28. Wet well warning light lamp, removal and installation.

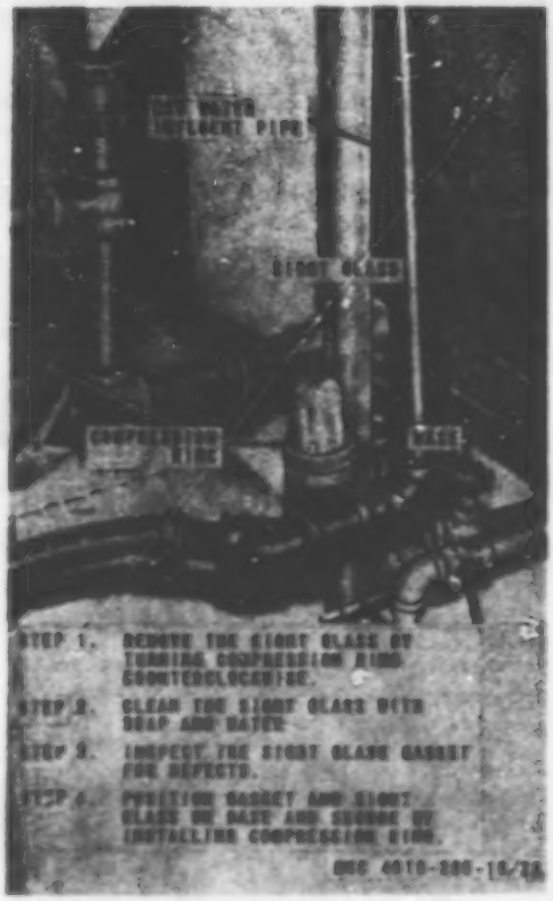

RAW WATER OUTLET PIPE
SIGHT GLASS
COMPRESSION RING
BASE
STEP 1. REMOVE THE SIGHT GLASS BY TURNING COMPRESSION RING COUNTERCLOCKWISE.
STEP 2. CLEAN THE SIGHT GLASS WITH SOAP AND WATER.
STEP 3. INSPECT THE SIGHT GLASS GASKET FOR DEFECTS.
STEP 4. POSITION GASKET AND SIGHT GLASS ON BASE AND SECURE BY INSTALLING COMPRESSION RING.
OSC 4010-280-19/28

Figure 29. Raw water sight glass service.

58. Raw Water Sight Glass Service

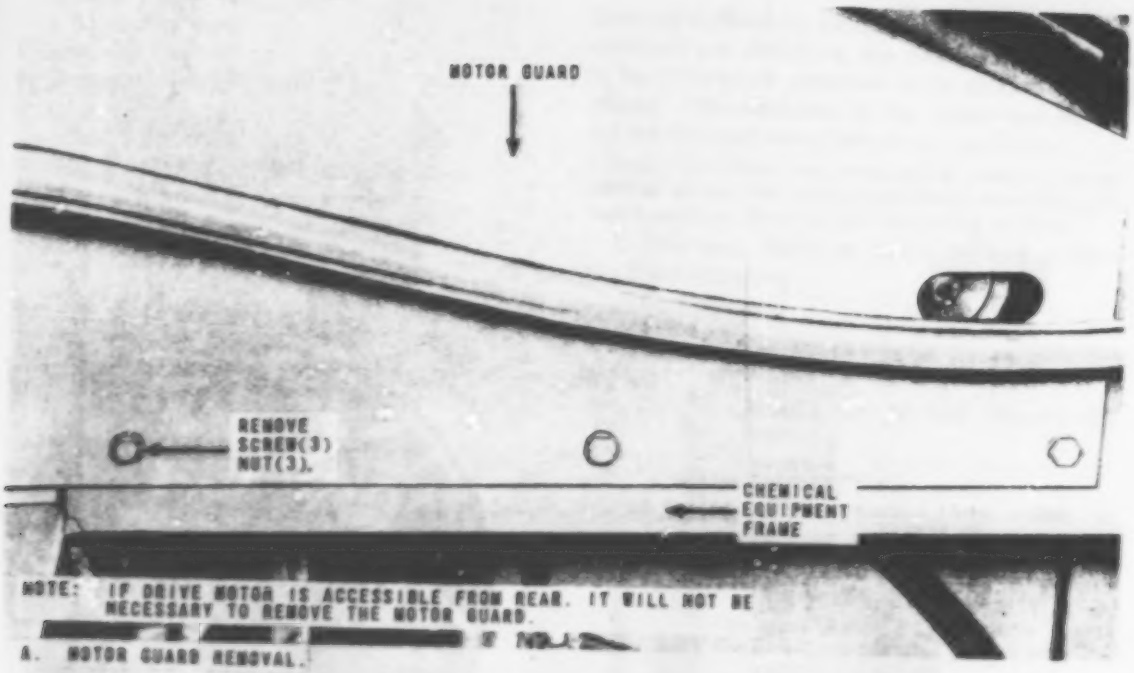
Refer to figure 29 and service the raw water sight glass.

59. Slurry Feeder Drive Belt Adjustment

Refer to figure 30 and adjust the slurry feeder drive belt.

60. Diatomite Filter Elements

a. General. Each filter contains six filter elements. Backwashing usually removes all diatomite and foreign matter from the filter elements. However, in the event that backwashing


MOTOR GUARD
REMOVE SCREW(3) NUT(3).
CHEMICAL EQUIPMENT FRAME
NOTE: IF DRIVE MOTOR IS ACCESSIBLE FROM REAR, IT WILL NOT BE NECESSARY TO REMOVE THE MOTOR GUARD.
A. MOTOR GUARD REMOVAL.

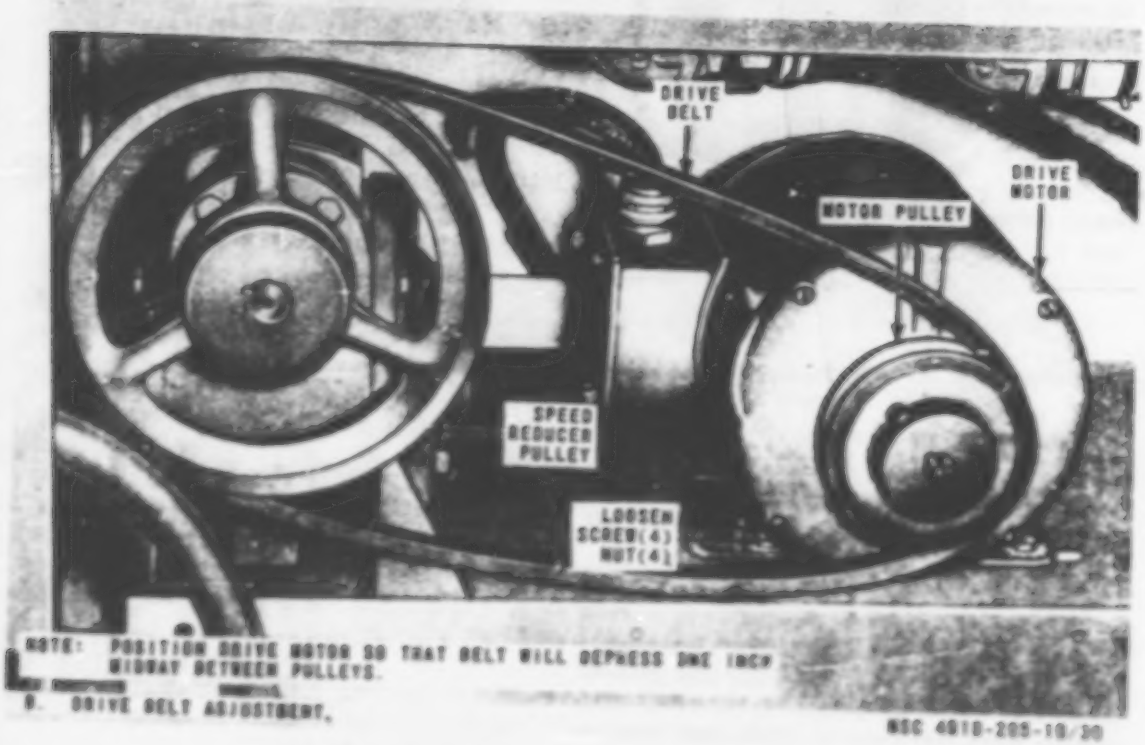

DRIVE BELT
DRIVE MOTOR
MOTOR PULLEY
SPEED REDUCER PULLEY
LOOSEN SCREW(4) NUT(4)
NOTE: POSITION DRIVE MOTOR SO THAT BELT WILL DEPRESS ONE INCH MIDWAY BETWEEN PULLEYS.
B. DRIVE BELT ADJUSTMENT.
MSC 4910-205-10/30

Figure 30. Slurry feeder drive belt adjustment.

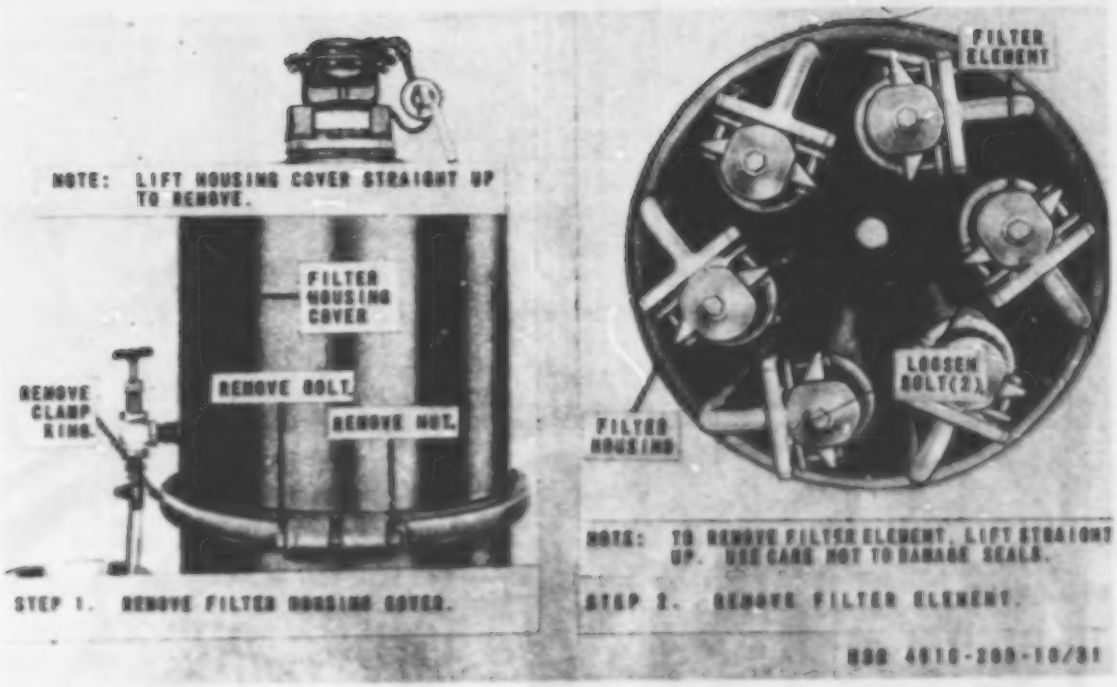

NOTE: LIFT HOUSING COVER STRAIGHT UP TO REMOVE.
FILTER HOUSING COVER
REMOVE BOLT
REMOVE NUT
REMOVE CLAMP RING
STEP 1. REMOVE FILTER HOUSING COVER.
FILTER ELEMENT
LOOSEN BOLT(2)
FILTER HOUSING
NOTE: TO REMOVE FILTER ELEMENT, LIFT STRAIGHT UP. USE CARE NOT TO DAMAGE SEALS.
STEP 2. REMOVE FILTER ELEMENT.
RRR 4910-299-10/31

Figure 31. Filter elements, removal and installation.

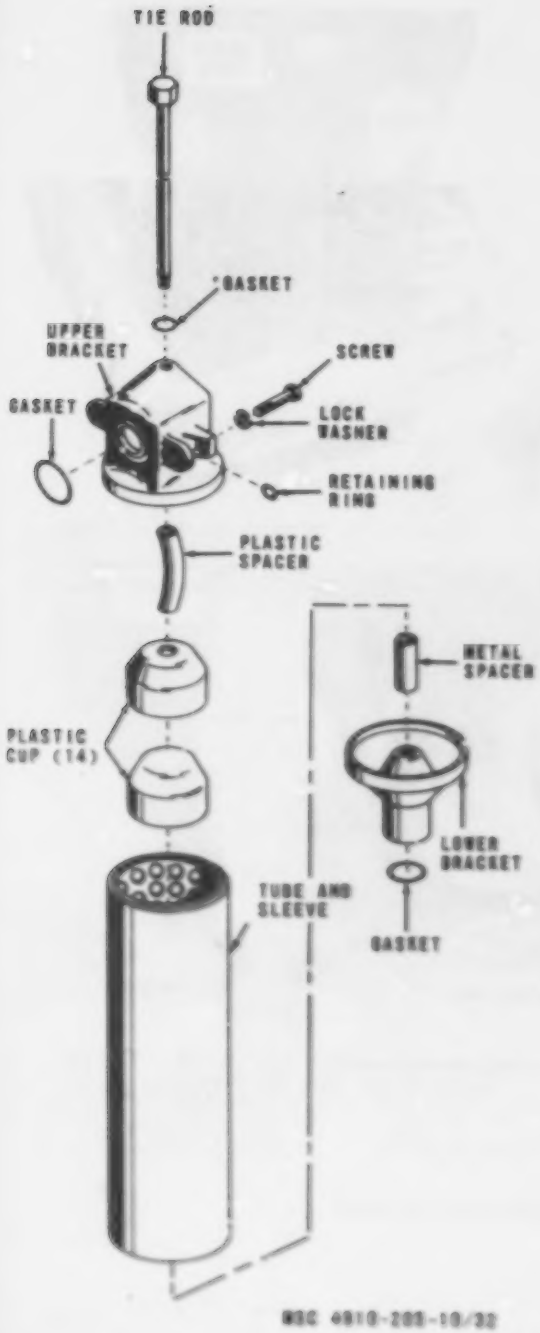


Figure 33. Filter elements, disassembly and reassembly.

does not sufficiently clean the elements or if the elements are defective, the elements may have to be completely removed to be cleaned or replaced. The condition of the filters may be observed through the windows in the filters.

Note. The filters are connected in parallel, corresponding to the filter pump connections, permitting disassembly of one filter without disturbing another.

b. Removal. Refer to figure 31 and remove the filter elements.

c. Disassembly.

(1) Refer to figure 32 and disassemble the filter elements.

(2) Refer to figure 33 and remove the plastic sleeve.

d. Cleaning and Inspection.

(1) Wash all parts in soap and water. If washing does not remove all foreign matter from the metal tubes, clean them with a wire brush or steel wool. Rinse all parts in fresh clean water to remove all traces of soap.

Warning: **Do not use gasoline or other such solvents to clean the filter elements. Always use filtered water, if available, to prevent contamination of water being filtered.**

(2) Inspect all parts for cracks, breaks, deterioration, and other damage. Inspect the filter element sleeves for damage that may render the sleeve unserviceable.

(3) Replace all damaged or defective parts.

e. Reassembly.

(1) Refer to figure 34 and install the plastic sleeve.

(2) Refer to figure 32 and reassemble the filter elements.

f. Installation. Refer to figure 31 and install the filter elements.

g. Field Expedient Repair. In the event of a defective filter element and no replacement parts are available, remove the adapter bushing from the threaded nipple at the base of the filter housing and cap the nipple with a ½-inch pipe cap. Use a blive'capping-off flange (furnished as basic issue item) to cover the upper element effluent pip flange. Replace the missing element as soon as possible. Do not operate a filter with more than two elements removed.

SLEEVE
METAL TUBE
STEP 1. FOLD BACK ONE END OF SLEEVE UNTIL IT IS EVEN WITH THE OTHER END.
METAL TUBE
SLEEVE
STEP 2. GRASP SLEEVE WITH ONE HAND AND TUBE WITH OTHER HAND.
METAL TUBE
SLEEVE
STEP 3. PULL SLEEVE FREE OF TUBE.
RSC 4810-205-10/32

Figure 53. Filter element plastic sleeve removal.

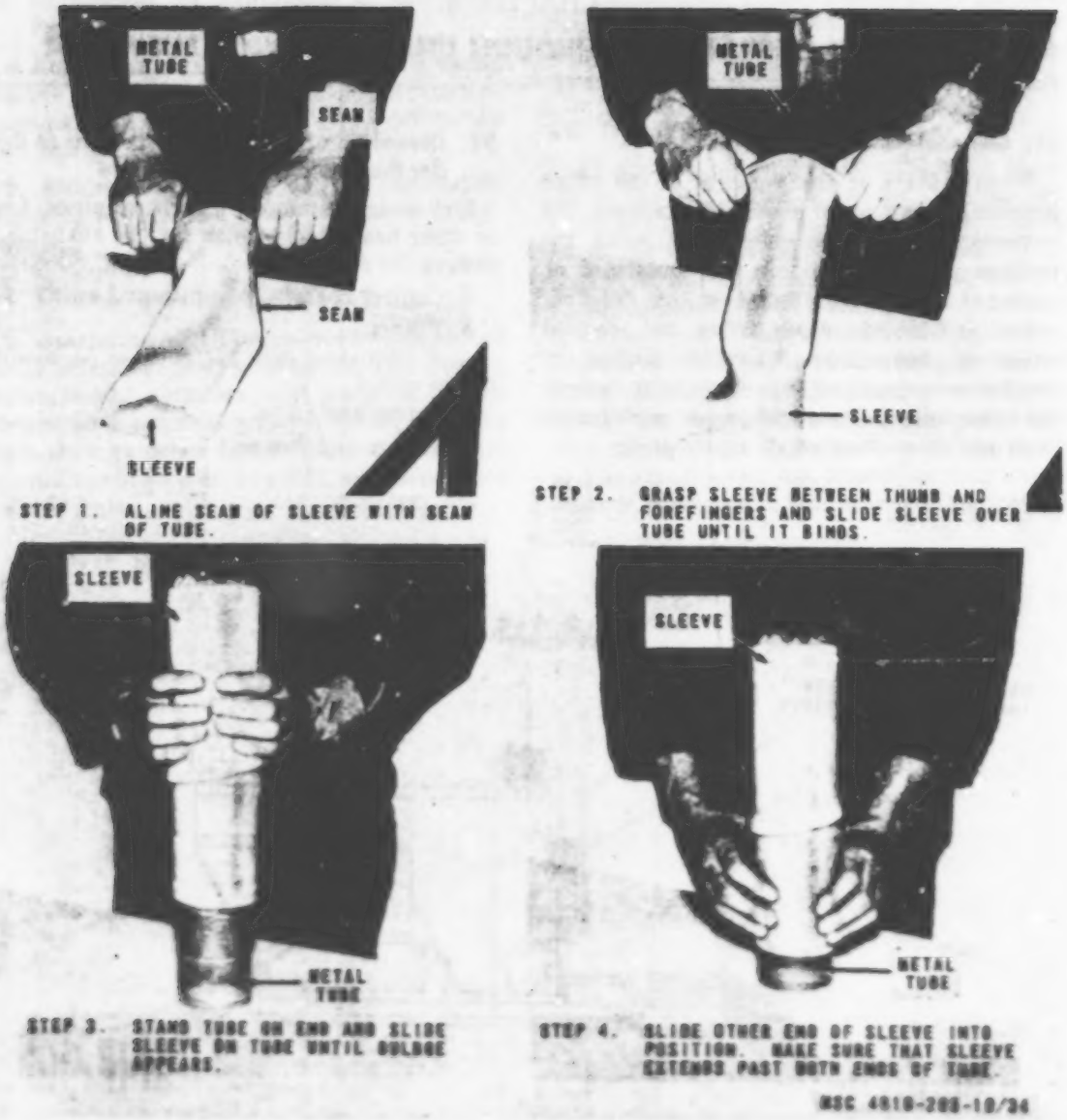

METAL TUBE
SEAM
SEAM
SLEEVE
STEP 1. ALINE SEAM OF SLEEVE WITH SEAM OF TUBE.
METAL TUBE
SLEEVE
STEP 2. GRASP SLEEVE BETWEEN THUMB AND FOREFINGERS AND SLIDE SLEEVE OVER TUBE UNTIL IT BINDS.
SLEEVE
METAL TUBE
STEP 3. STAND TUBE ON END AND SLIDE SLEEVE ON TUBE UNTIL BULGE APPEARS.
SLEEVE
METAL TUBE
STEP 4. SLIDE OTHER END OF SLEEVE INTO POSITION. MAKE SURE THAT SLEEVE EXTENDS PAST BOTH ENDS OF TUBE.
NSC 4810-203-10/34

Figure 34. Filter element plastic sleeve installation.

CHAPTER 4

DEMOLITION OF WATER PURIFICATION UNIT TO PREVENT ENEMY USE

61. General

When capture or abandonment of the water purification unit to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all water purification units and all corresponding repair parts.

62. Demolition by Mechanical means to Render the Equipment Inoperative

Use sledge hammers, crowbars, picks, axes, or other heavy tools which may be available to destroy the following:

a. Control box.

b. Filters.

Note. The above steps are minimum requirements for this method.

c. Valves and hoses.

d. Motors and pumps.

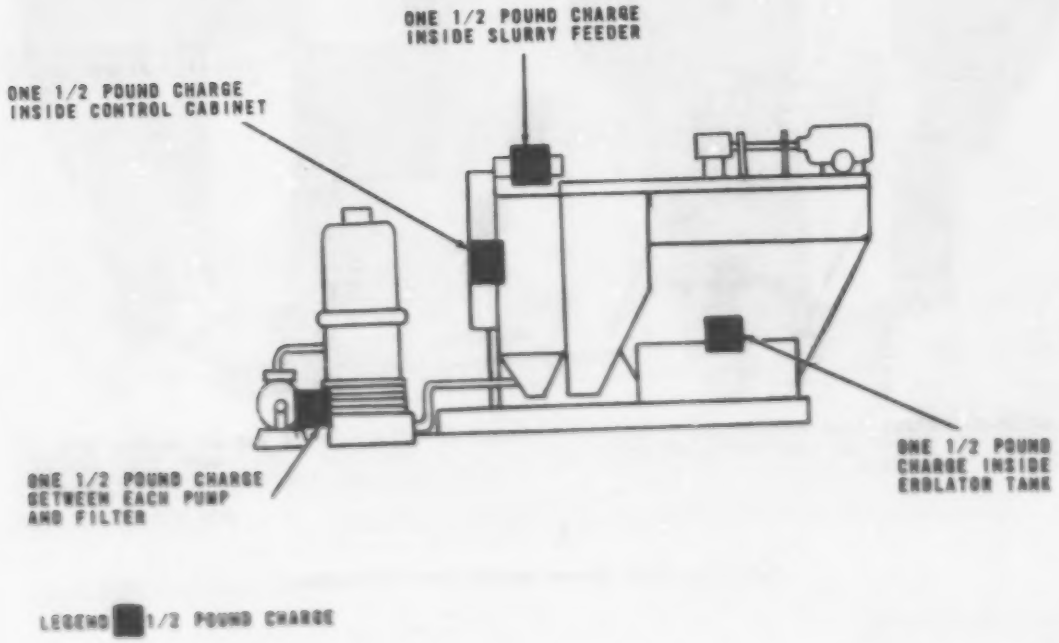

ONE 1/2 POUND CHARGE INSIDE SLURRY FEEDER
ONE 1/2 POUND CHARGE INSIDE CONTROL CABINET
ONE 1/2 POUND CHARGE BETWEEN EACH PUMP AND FILTER
ONE 1/2 POUND CHARGE INSIDE ERDLATOR TANK
LEGEND 1/2 POUND CHARGE
BSC 4910-203-10/33

Figure 33. Placement of charges.

e. Chemical feeders.

f. Erdlator tank.

63. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the following charges (fig. 35) as the situation permits and detonate them simultaneously with a detonating cord and suitable detonator.

b. Weapons Fire. Fire on the purification unit with the heaviest practical weapons available.

64. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible parts such as the filter pumps, water hoses, agitators and chemical feeder motors, and chemical solution feeder. Scatter them through dense foliage, bury them in dirt or sand, or throw them in a lake, stream or other body of water.

b. Burning. Pack rags, clothing, or canvas under and around the unit. Saturate the packing with gasoline, oil, or diesel fuel and ignite.

c. Submersion. Totally submerge the purification unit in a body of water to provide water damage and concealment. Salt water will do greater damage to metal parts than fresh water.

65. Training

All operators should receive thorough training in the destruction of the purification unit. Refer to FM 5–25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.

APPENDIX I
REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320–5	Dictionary of United States Army Terms.
AR 320–50	Authorized Abbreviation and Brevity Codes.

2. Lubrication

LO 5-4610–205–20	Water Purification Unit: Base Mounted; Electric Driven, AC, 115, 208 Volt, Single Phase and 3 Phase, 60 Cycle; 3000 Gallons Per Hour (Met-Pro Model 3000–2700A).

3. Painting and Preservation

TB ENG 60	Preservation and Painting of Serviceable Engineer Equipment.

4. Preventive Maintenance

AR 750–5	Organization, Policies, and Responsibilities for Maintenance Operations.
TM 38–750	The Army Equipment Record System and Procedures.

5. Protection

TM 5–349	Arctic Construction.

6. Publication Indexes

DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, and Phonograph Recordings.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Training Publications.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310–5	Index of Graphic Training Aids and Devices.
DA Pam 310–25	Index of Supply Manuals—Corps of Engineers.

7. Sanitation

FM 21–10	Military Sanitation.

8. Supply Publications

SM 10–C9100–SL	Petroleum, Petroleum-Base Products and Related Material.
SM 5–4–4610–S12	Stock List of Components of Sets, Kits, and Outfits; Water Purification Equipment Set; 3,000 Gal. Per Hour; Base Mounted FSN 4610–202–8700.
TM 5–4610–205–20P	Organizational Maintenance Repair. Parts and Special Tool Lists, Water Purification Unit: Base Mounted; Electric Driven Ac, 115, 208 Volt, Single Phase and 3 Phase, 60 Cycle; 3,000 Gallons Per Hour (Met-Pro Model 3000–2700–A) FSN 4610–857–0330.

AGO 6871A

GPO 804-765-4

9. Training Aids

FM 21–5	Military Training.
FM 21–6	Techniques of Military Training.
FM 21–30	Military Symbols.

10. Water Supply

TM 5–700	Field Water Supply.

APPENDIX II

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required in first echelon maintenance and operation, initially issued with, or authorized for the water purification unit. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Technical service.* This column lists the basic number (or symbol) of the technical service assigned supply responsibility for the part. Blank spaces donate Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other technical services basic numbers (or symbols) are—

9—Ordnance Corps
10—Quartermaster Corps
12—Adjutant General Corps

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(*a*) P—applied to high-mortality repair parts which are stocked in or supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.

(*b*) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from technical service depots, and authorized for installation at indicated maintenance echelons.

(*c*) M—applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance echelons.

(*d*) X2—applied to repair parts which are not stocked.. The indicated maintenance echelon requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational Maintenance (1st and 2d echelon).

(4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(*a*) R—applied to repair parts and assemblies which are economically repairable at field maintenance facilities (3d and 4th echelons) and normally are furnished by supply on an exchange basis.

(*b*) T—applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance facilities.

(*c*) U—applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

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Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Numbers. The Federal stock number will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.
Example: (08645) 86453

(3) The letters GE, shown in parentheses immediately following the description, indicate General Engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued With Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

3. Index to Federal Supply Code for Manufacturers

91340.....Met-Pro Inc.

4. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers assigned to each component application, to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column lists the basic number of the technical service assigned supply responsibility for the item. Blank spaces denote Corps of Engineers supply responsibility. Other technical services basic numbers are—

3—Chemical Corps
10—Quartermaster Corps

Note. Include only the applicable technical services.

d. Federal stock: Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item name and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average 8 hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding columns.

5. Comments and Suggestions

Suggestions and recommendations for changes to the basic issue items list and/or maintenance and operating supplies table will be submitted on DA Form 2028 to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: SMOMS—MM, Box 119, Columbus 16, Ohio. Direct communication is authorized.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig	Item
					GROUP 26—ACCESSORIES, PUBLICATIONS, TEST EQUIPMENT AND TOOLS						
					2602—ACCESSORIES						
	P	O	-----	7520-559-9618	CASE, MAINTENANCE AND OPERATIONAL MANUALS: cotton duck, water-repellent, mildew resistant. (GE)	-----	-----	1	1		
	P1	O	-----	4610-887-1236	CABLE ASSEMBLY: power electrical (91340) MPC106.	-----	-----	3	3		
	P1	O	-----	4610-887-1235	CABLE ASSEMBLY: power electrical (91340) MPC107.	-----	-----	3	3		
	P1	O	-----	5975-972-8028	GROUND ROD AND CABLE (91340) 9576-53-2.	-----	-----	2	2		
	X2	O	-----	----------	FLOAT, 10 in. (91340) D9576-53-1.	-----	-----	1	1		
	P1	O	-----	4730-277-6844	ADAPTER, STRAIGHT, PIPE TO HOSE: brass 11½ NPT, male 1½ in., 11½ NPS male. (GE)	-----	-----	6	6		
	P1	O	-----	4730-277-6845	ADAPTER, STRAIGHT, PIPE TO HOSE: brass, 2 in. 11½ NPT, male, 2 in., 11½ NPSH, male. (GE)	-----	-----	1	1		
					2603—COMMON TOOLS						
10	P	O	-----	5120-242-3913	HAMMER, HAND: machinist, ball-peen, ½ lb.	-----	-----	1	1		
10	P	O	-----	5120-223-7397	PLIERS, SLIP JOINT: 8 in. combination w/cutter.	-----	-----	1	1		
10	P	O	-----	5120-277-1479	WRENCH, PIPE: aluminum alloy, adjustable jaw, 1 to 2 in. capacity, 18 in. lg.	-----	-----	1	1		
10	P	O	-----	5120-264-3796	WRENCH, OPEN END, ADJUSTABLE: single-head, 0 to 1.322 in. jaw opening cap, 12 in. normal lg overall.	-----	-----	1	1		
10	P	O	-----	5120-227-7362	SCREWDRIVER, FLAT TIP: plastic handle, flared tip, ⅝ in. width of tip, 12 in. lg.	-----	-----	1	1		
10	P	O	-----	5120-278-1283	SCREWDRIVER, FLAT TIP: 6 in. blade.	-----	-----	1	1		
					2605—PUBLICATIONS						
12	-----	-----	-----	----------	DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5-4610-205-20.	-----	-----	1	1		
12	-----	-----	-----	----------	DEPARTMENT OF THE ARMY OPERATOR'S MANUAL TM 5-4610-205-10.	-----	-----	2	2		
12	-----	-----	-----	----------	DEPARTMENT OF THE ARMY ORGANIZATIONAL MANUAL TM 5-4610-205-20.	-----	-----	2	2		

Section II. BASIC ISSUE ITEMS LIST — Continued

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Item	Fig
12	-----	-----	-----	----------	DEPARTMENT OF THE ARMY ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOL LIST TM 5-4610-205-20P. GROUP 51—WATER PURIFICATION 5109—MULTIPLE TAKEOFF	-----	-----	2	2		
	X2	-----	-----	----------	PULLEY: 4½ in. dia. ⅝ in. bore, (91340) MP-A-365. GROUP 56—FILTERS/ SEPARATORS 5604—CANISTERS AND ELEMENTS	-----	-----	1	1		
9	P	O	-----	5305-017-9841	SCREW, CAP, HEXAGON HEAD: ⅝-16 thd size, 1¼ in. lg.	-----	-----	12	12		
	X2	-----	-----	----------	FLANGE, BLIND: aluminum (91340) B-119. 5605—COMMON VALVES LINES AND FITTINGS	-----	-----	6	6		
				4730-231-2411	CAP, PIPE: ⅛ in.-14 thd size (GE)	-----	-----	6	6		
	P1	O	-----	4730-277-6191	CLAMPS, HOSE: tangential type, 3⅛ dia, (08484) QS200-M528.	-----	-----	12	12		

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Section III. MAINTENANCE AND OPERATING SUPPLIES

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	OIL CAN POINTS	10	9150-231-6653	LUBRICATING OIL:		(1)	(1) See current LO for grade application and replenishment intervals.
		10	9150-265-9433	5-gal pail or 1-qt can as follows:			
		10	9150-231-9037	Grade 9250 or			
		10	9150-265-9425	OE-30			
		10	9150-242-7602	Grade 9110 or			
				OE-10			
				OES			
2	GREASE POINTS	10	9150-190-0904	GREASE, AUTOMOTIVE AND ARTILLIARY GAA, 1 lb can.		(1)	
3	5102—CHEMICAL SOLUTION FEEDER GEAR CASE	10	9160-685-0912	INSULATING OIL, ELECTRICAL, 1 qt can.	5 qt	(1)	
	5102—CHEMICAL SOLUTION FEEDER	3	6810-238-8115	CALCIUM HYPROCHLORITE, 5 lb can.	1.25 lb	1.25 lb	
		3	6810-664-0283	FERRIC CHLORIDE, 100 1 lb bags per drum.	5 lb	5 lb	
	5102—CHEMICAL SLURRY FEEDER	3	6110-264-6575	CHARCOAL, ACTIVATED, 5 lb bag	1.4 lb	1.4 lb	
		3	9390-282-4161	DIATOMACEOUS EARTH, 25 lb bag	7 lb	7 lb	
		3	9620-585-2017	LIMESTONE, PULVERIZED, 80 lb bag.	14 lb	14 lb	
		3	9390-282-4161	DIATOMACEOUS EARTH, 25 lb bag	1½ lb	1½ lb	
4	5102—FILTER	10	9150-261-8293	GREASE, PLUG, VALVE 24 sticks per box, ACF No. 24 or equal.	4 sticks	(1)	
5	5103—PLUG VALVES						
6	5109—SPEED REDUCER FOR ERDLATOR	10	9150-754-2635	LUBRICATING OIL: 1 qt can as follows: Grade GO-90.	⅞ qt	(1)	
		10	9150-577-5847	LUBRICATING OIL: 5 gal can as follows: Grade GO-140.	⅞ qt	(1)	
		10	9150-261-7904	LUBRICATING OIL: 1 qt can as follows: GOS.	⅞ qt	(1)	
7	5109—SPEED REDUCER FOR SLURRY FEEDER	10	9150-754-2635	LUBRICATING OIL: 1 qt can as follows: Grade GO-90.	⅞ qt	(1)	
		10	9150-577-5847	LUBRICATING OIL: 5 gal can as follows: Grade GO-140.	⅞ qt	(1)	
		10	9150-261-7904	LUBRICATING OIL: 1 qt can as follows: GOS.	⅞ qt	(1)	

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For explanation of abbreviations used, see AR 320-50.

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